OLYMPUS SYSTEM MICROSCOPE

MODEL CH
REPAIR MANUAL

OLYMPUS

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TO OLYMPUS MICROSCOPE SERVICING PERSONNEL

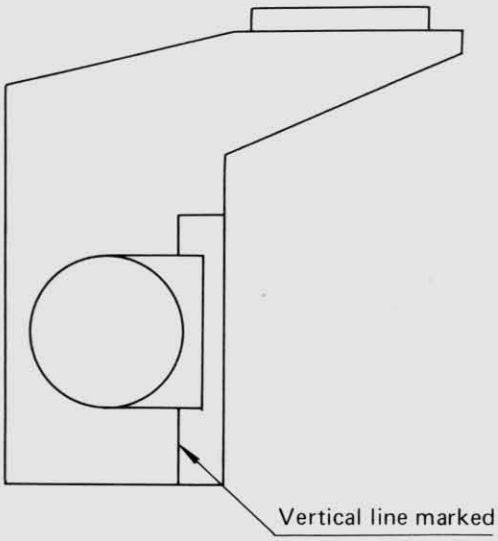
CH Series Microscope is widely used throughout the world for training students and inspecting various specimens. Since this microscope is frequently operated for routine microscopy, it is to be often repaired at your shop. Accordingly, this manual should be highly helpful for servicing personnel.

As you know, the coarse and fine adjustment mechanism of CH Series is nearly the same as that of the preceding BH Series. The servicing personnel having experience in repair of BH Series can therefore easily repair CH Series.

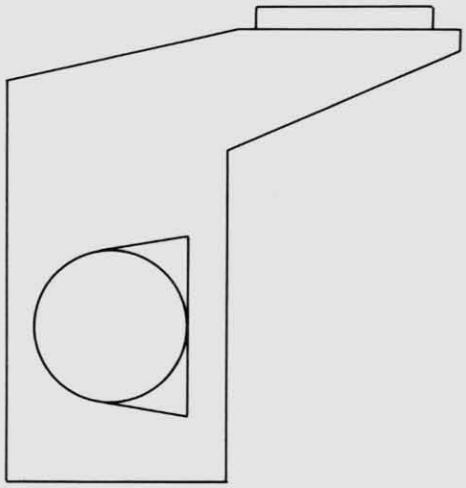
However, attention must be paid to the fact that CH Series has undergone modification of its coarse adjustment guide, and accordingly this series currently uses new and old types of coarse adjustment guides.

The old and new types of the current CH Series can be discriminated from each other by a vertical line as illustrated below. The old one was switched to the new one at the beginning of 1979.

CHA-F (Old type)
AA872000



CHA-F-3 (New type)
AA819500



This manual describes repairing procedures for the new type of microscope first, and those for the old type separately at the last part.

CH Series adopts the binocular tube which is quite the same as that of the BH Series. For repairing procedures of the binocular tube, reference should therefore be made to the repair manual for BH Series.

"Right side" and "left side" used in descriptions denote those as seen by the microscopist in his observing position.

In addition, the mechanical stage of Model IMT is nearly the same as that of CH-MVR, and the servicing personnel should refer to this manual.

Requisites for repairs:

1. First of all, ascertain what parts of the microscope the user or owner of which wishes you to repair.
2. Never fail to check the entire function of the microscope before you commence its repair.
   a) Find out what prts are defective and how much they are damaged.
   b) Prior to repair, think of the best possible order of disassembling the defective parts in a most efficicent way.
3. After completing the repair, check the functions of not only the re-assembled parts but also the entire microscope to make sure no defect should be left unremedied.
4. Be careful not to deform repair parts during the assembly; make it practice to use tools and jigs specified for purpose.
5. Make repairs promptly and accurately.

1. REPAIR TOOLS AND GREASE

1-1 Regular Tools

OT0011	Set of screwdrivers (6 pcs.)
OT0015	Phillips screwdriver (medium size)
OT0016	Phillips screwdriver (large size)
OT0017	Screwdriver (small size)
OT0023	Handle of small size of Phillips screwdriver
OT0035	Tweezers (special made)
OT0044	Torque screwdriver
OT0216	Set of Allen wrenches (8 pcs.)
OT0317	Thickness gauge
OT1027	Alon Alpha
OT1131	Shellac (20 g)
OT1141	Phillips screwdriver tip, using OT0023

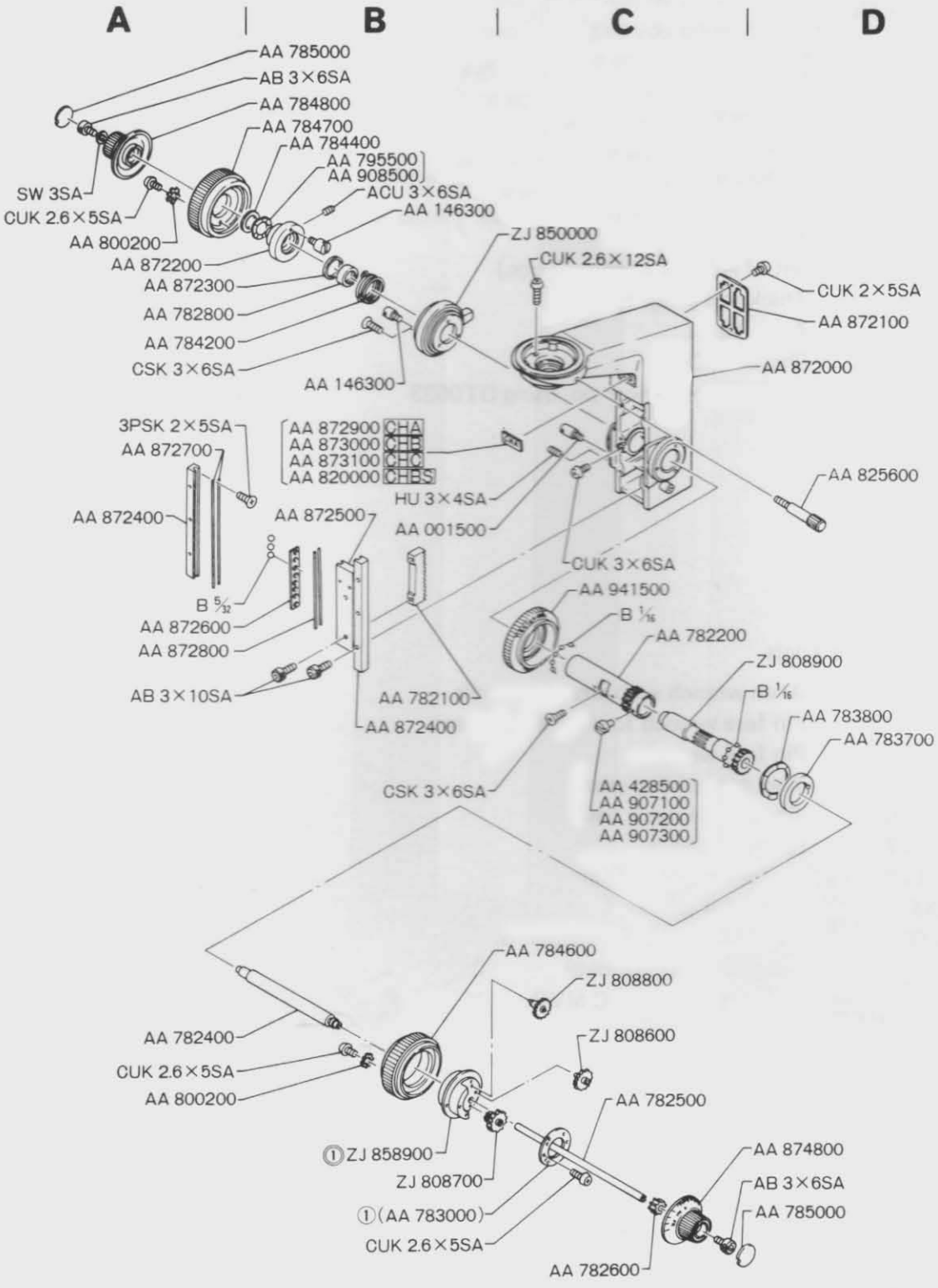
1-2 Grease

OT2006
OT2008
OT2010
OT2012

1-3 Special Jigs and Tools

KKACU2.5	Allen wrench with straight handle
KKAA7828	Pin face wrench for fine adjustment
KKAA8716	Pin face wrench
KC-2010	Tool for holding gear
B-KC0026	Jig for receptacle balls
B-KC0027	Spoon for balls
B-KC0028	Jig for receptacle balls
SKN0003	Gauge for checking stage tilt alignment
CHKC0001	Jig for adjusting movement of C-MVR
CHKC0002	Jig for adjusting movement of C-MVR
CHKC0003	Support frame for C-MVR

2. EXPLODED PARTS DIAGRAMS

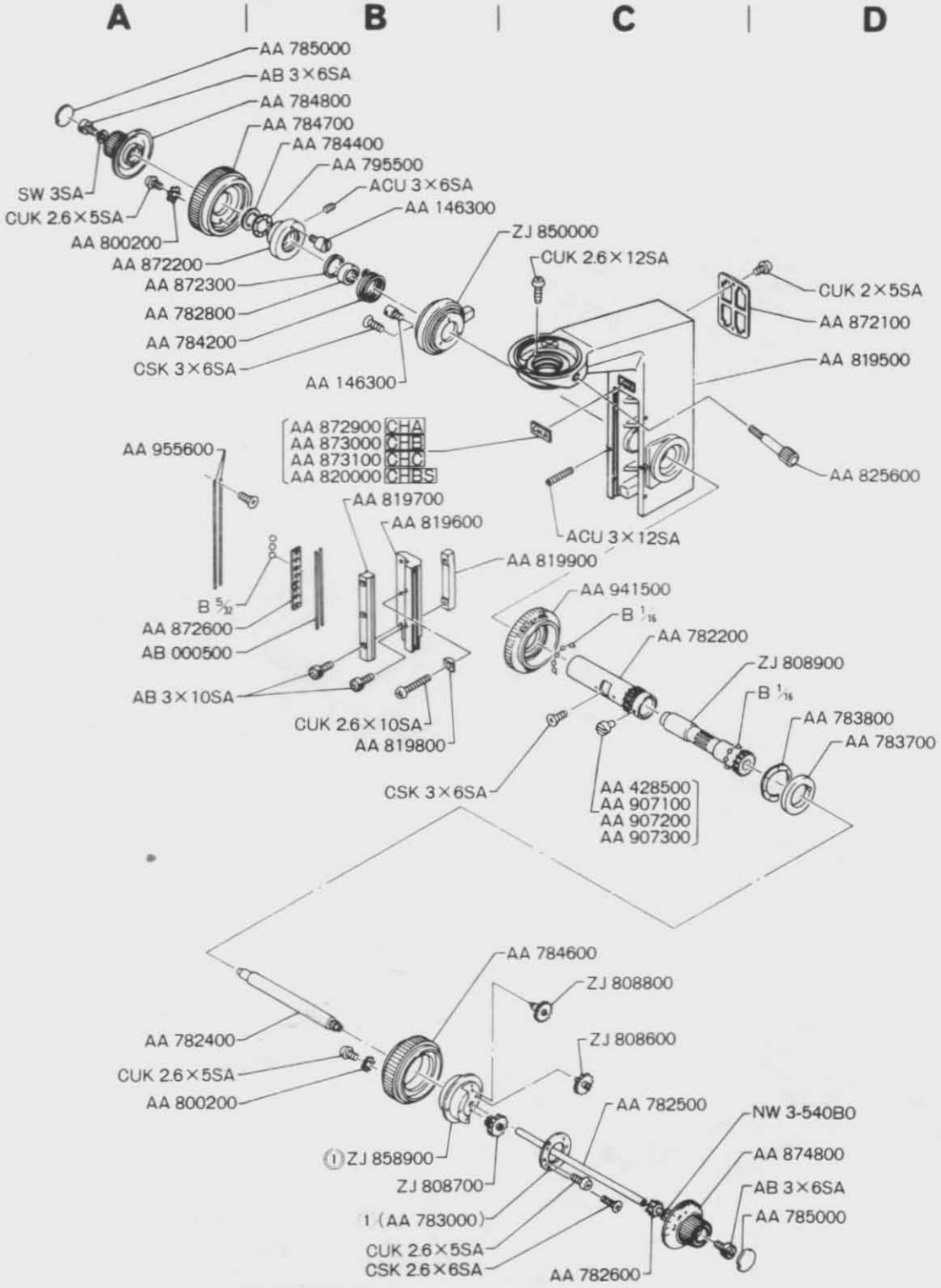


EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
CH	C-AA-2	
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

②



EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
CH	C-AA-3	

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

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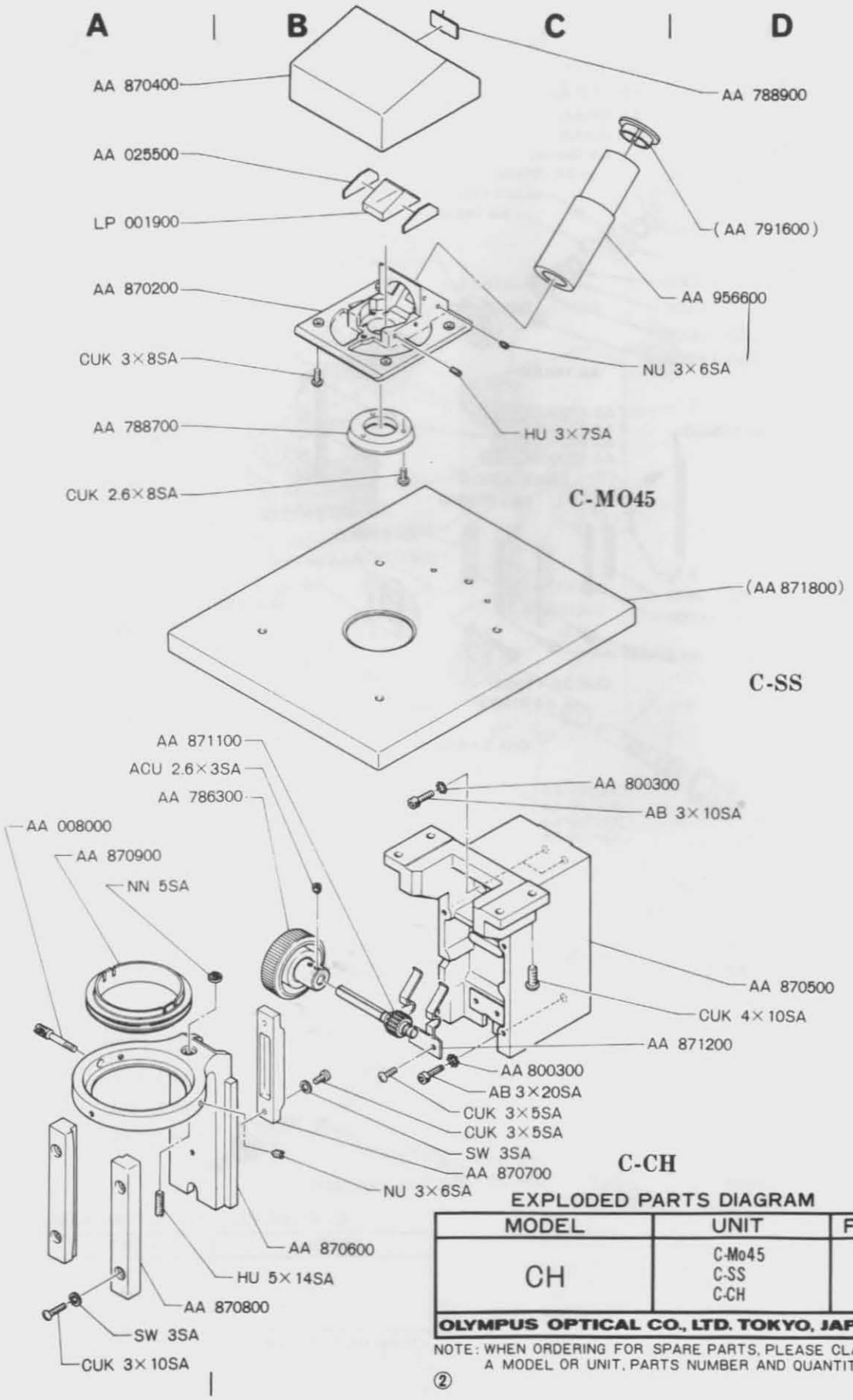

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
CH	C-Mo45 C-SS C-CH	

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

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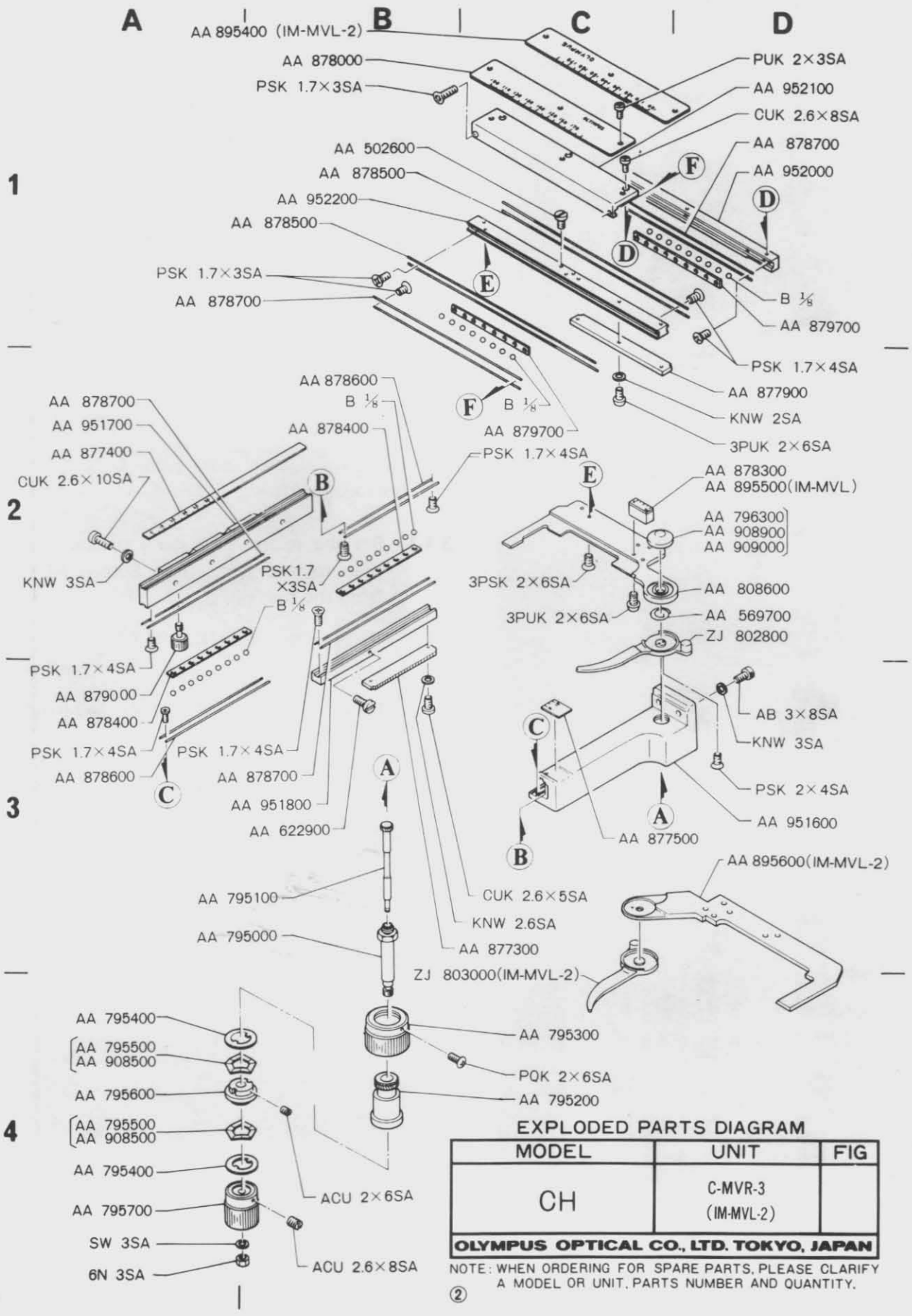

EXPLODED PARTS DIAGRAM

MODEL	UNIT	FIG
CH	C-MVR-3 (IM-MVL-2)	

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NOTE: WHEN ORDERING FOR SPARE PARTS, PLEASE CLARIFY A MODEL OR UNIT, PARTS NUMBER AND QUANTITY.

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3. DISASSEMBLING PROCEDURES FOR CHA-F-3

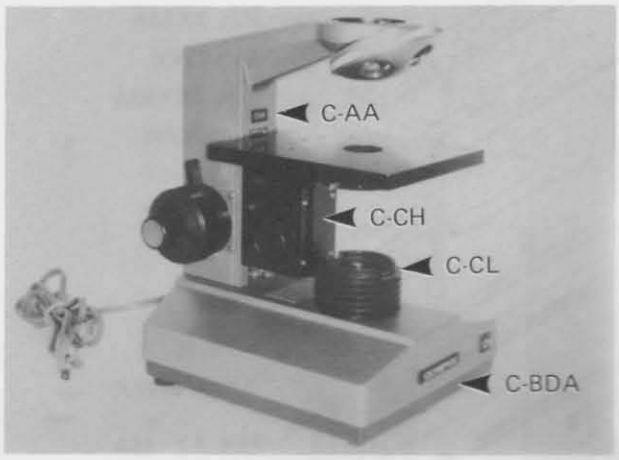


Fig. 3-1

C-AA: Arm
C-CH: Condenser holder
C-CL: Light exit
C-BDA: Electrical base plate

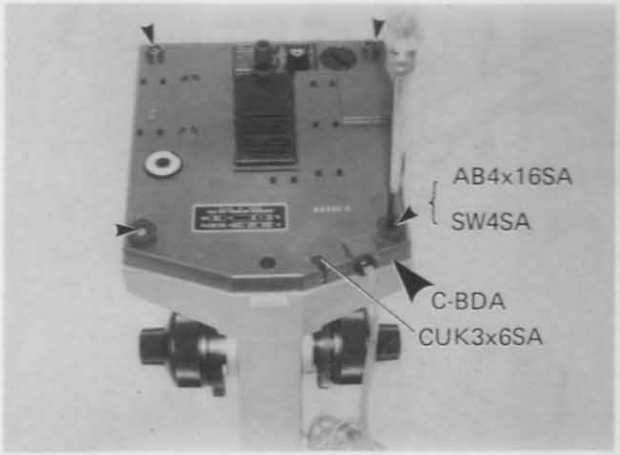


Fig. 3-2

3-1 Detach Electrical base plate C-BDA from the microscope stand.

3-1-1 Set the microscope stand upside down and then remove four fixing Screws AB4x16SA from the base plate. (See Fig. 3-2)

3-1-2 Remove Screw CUK3x6SA from the grounding line. (See Fig. 3-2)

3-1-3 Detach the electrical base plate by lifting it.

3-2 By removing three Screws CUK3x6SA, dismount Light exit C-CL. (See Fig. 3-3)

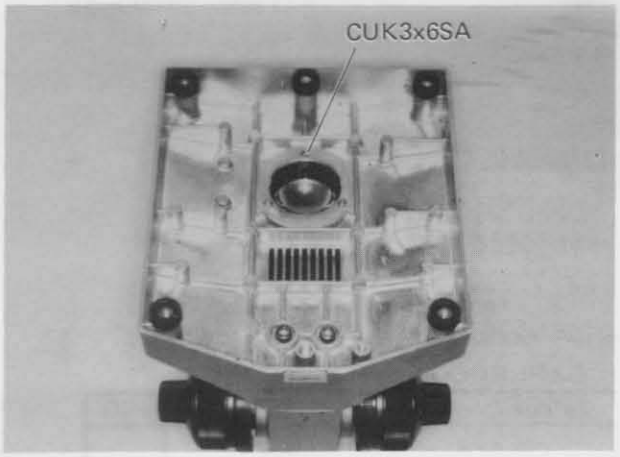


Fig. 3-3

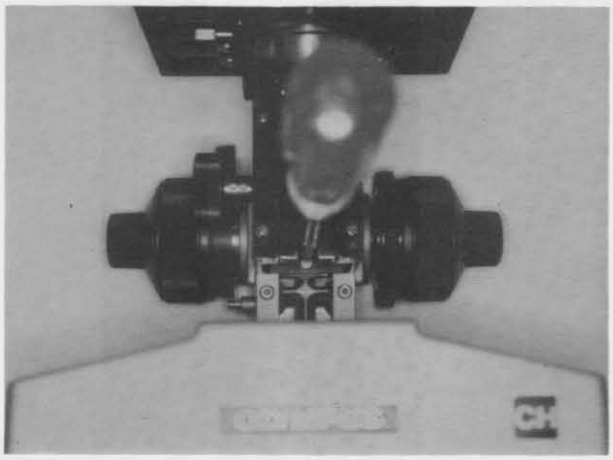


Fig. 3-4

3-3 Disassemble Condenser holder C-CH by removing three Screws AB3x10SA and three Washers AA800300.

3-3-1 Rack up the condenser holder to its upper limit. Remove Screw AB3x10SA which is visible through the notch formed under Holder AA870600. (See Fig. 3-4)

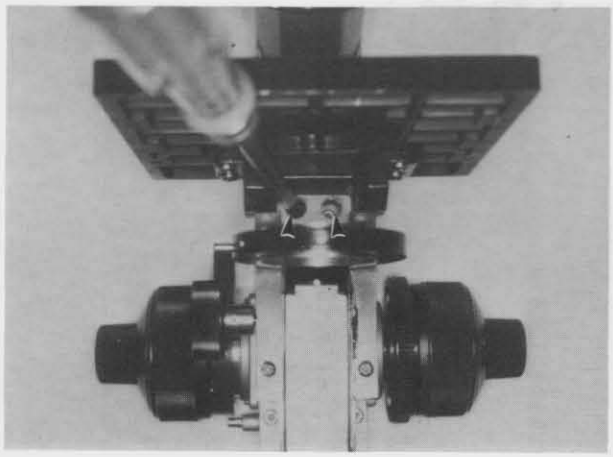


Fig. 3-5

3-3-2 Rack down the condenser holder to its lower limit and then remove two Screws AB3x10SA. (See Fig. 3-5)

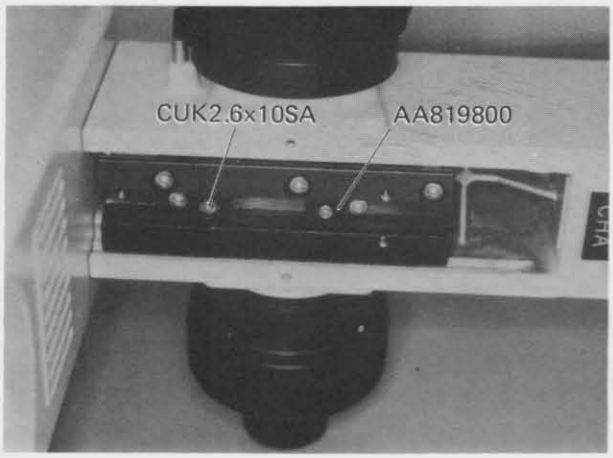


Fig. 3-6

3-4 Disassembling procedures for coarse adjustment guide.

NOTE:

For disassembling procedures of the coarse adjustment guide of CHA-F (old type), see 10-1 of this manual.

3-4-1 Detach two Fixing pieces AA819800 by removing two Screws CUK2.6x10SA. (See Fig. 3-6)

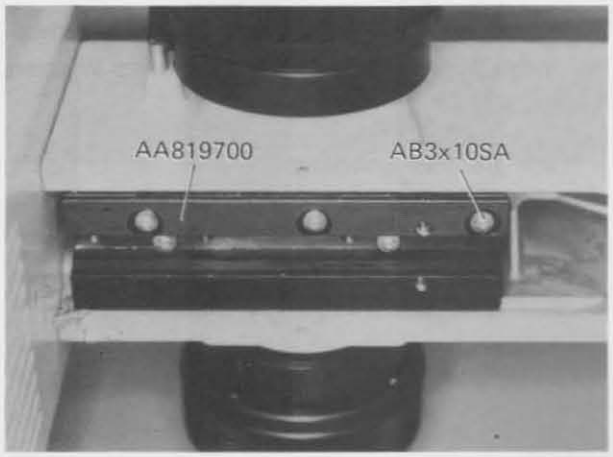


Fig. 3-7

3-4-2 Remove three Screws AB3x10SA from Inner guide AA819700. (See Fig. 3-7)

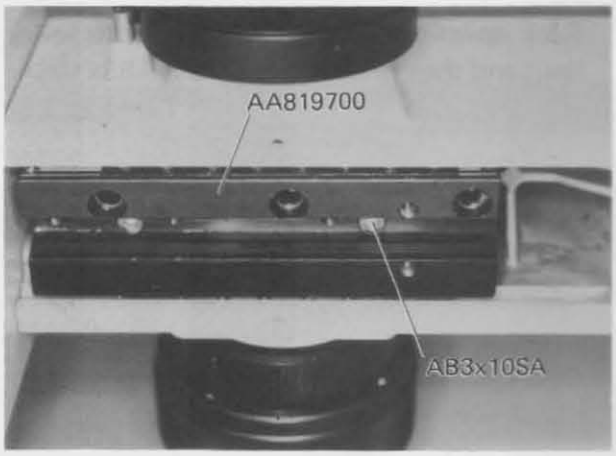


Fig. 3-8

3-4-3 Loosen two Screws AB3x10SA on Rack AA819900. (See Fig. 3-8)

3-4-4 Disassemble Inner guide AA819700. Eight Balls B 5/32 and Casing AA872600 are disassembled together with the inner guide.

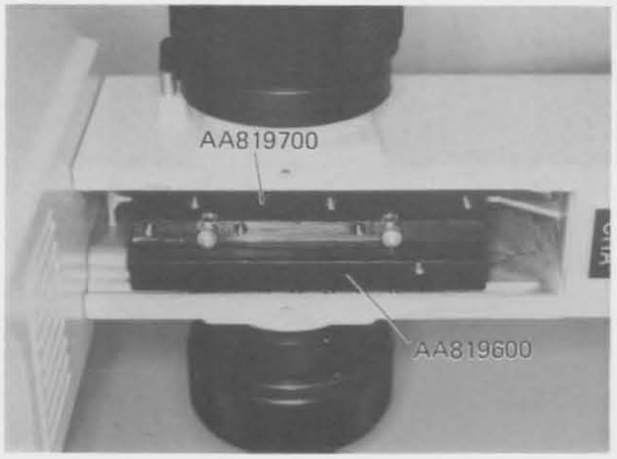


Fig. 3-9

3-4-5 Disassemble Inner guide AA819600. Eight Balls B 5/32 and Casing AA872600 are disassembled together with the inner guide. (See Fig. 3-9)

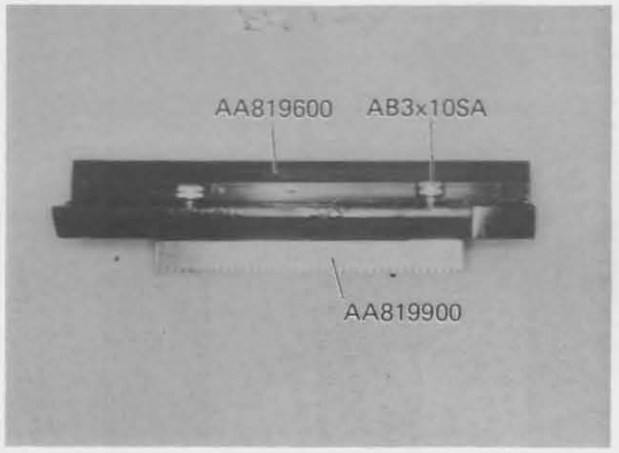


Fig. 3-10

3-4-6 By removing two Screws AB3x10SA, dismount Rack AA819900 from Inner guide AA819600. (See Fig. 3-10)

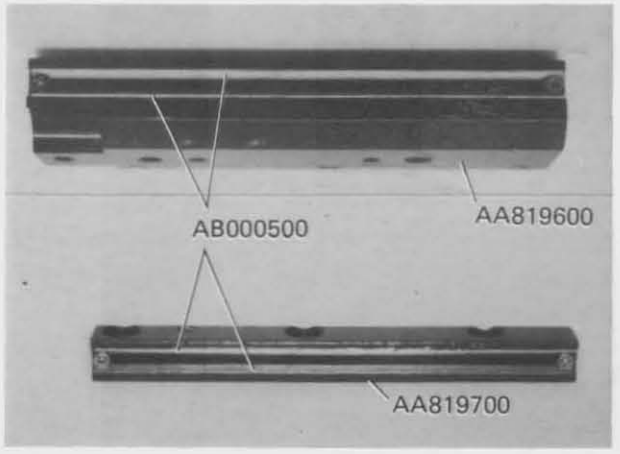


Fig. 3-11

3-4-7 By removing two Screws 3PSK1.7x5SA, disconnect Wires AB000500 from Inner guide AA819600. Disconnect Wires AB000500 from Inner guide AA819700 in the similar procedures. (See Fig. 3-11)

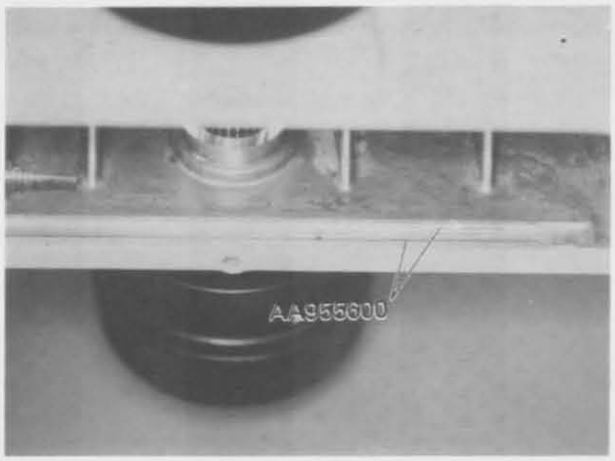


Fig. 3-12

3-4-8 Disconnect Wire AA955600 from Arm AA819500. (See Fig. 3-12)

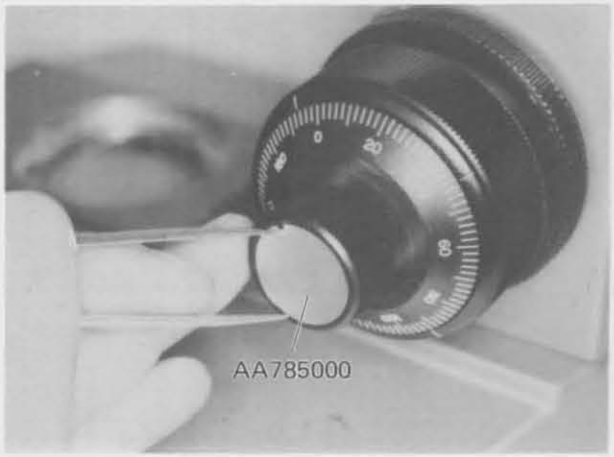


Fig. 3-13

3-5 Disassembling procedures for coarse and fine adjustment knobs.

3-5-1 Disassemble the fine adjustment knobs in the procedures given below:

a) Detach right and left Plates AA785000. They can be detached with tweezers fitted into the notches formed in the plates. (See Fig. 3-13)

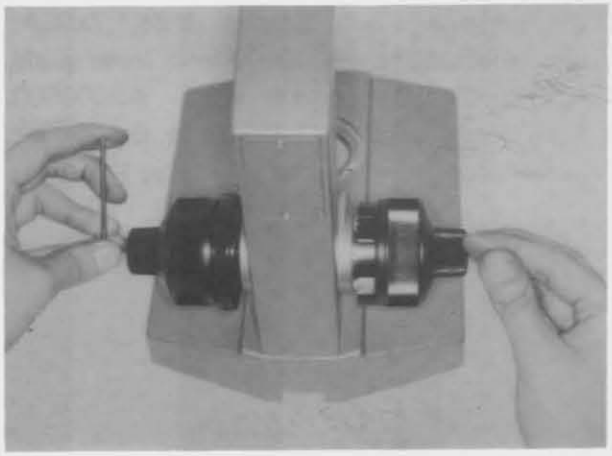


Fig. 3-14

b) Remove Screws AB3x6SA from the right and left fine adjustment knobs. To remove the screws, fit the allen wrench into them and turn counterclockwise. (See Fig. 3-14)

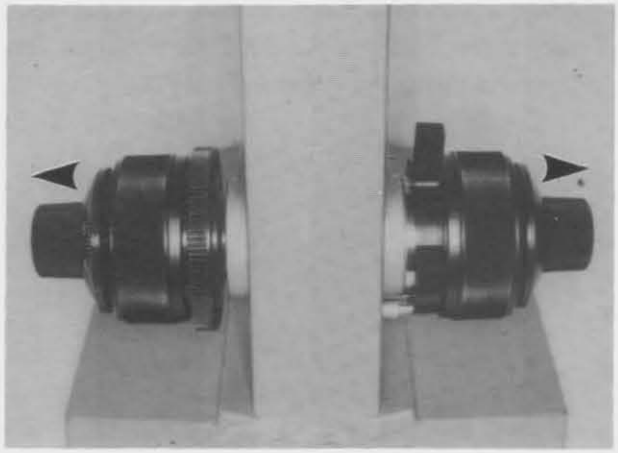


Fig. 3-15

c) Pull out the fine adjustment knobs in both directions. (See Fig. 3-15)

Fig. 3-16

3-5-2 Detach Washer AA784400. (See Fig. 3-16)

Fig. 3-17

3-5-3 Detach Spring AA795500. (See Fig. 3-17)

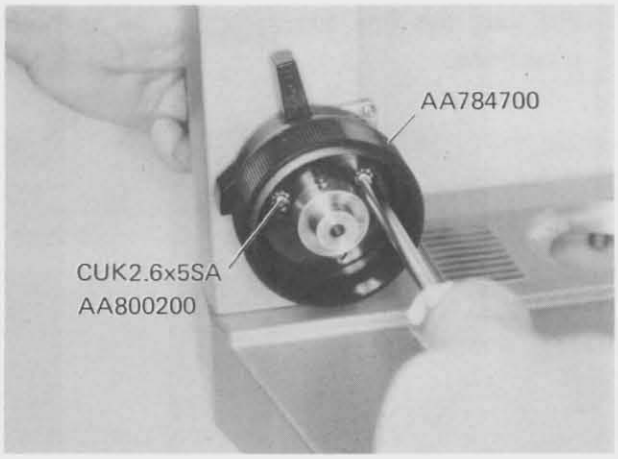


Fig. 3-18

3-5-4 After removing three Screws CUK2.6x5SA and three Washers AA800200, pull out left Coarse adjustment knob AA784700.
(See Fig. 3-18)

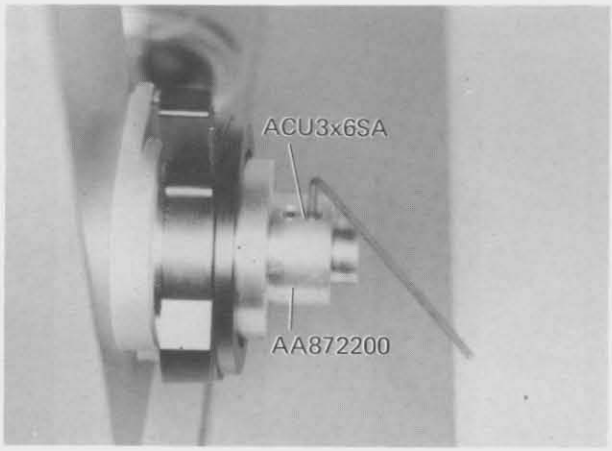


Fig. 3-19

3-5-5 Disassemble Shaft holder AA872200 in the following procedures:

a) Loosen two Screws ACU3x6SA.
(See Fig. 3-19)

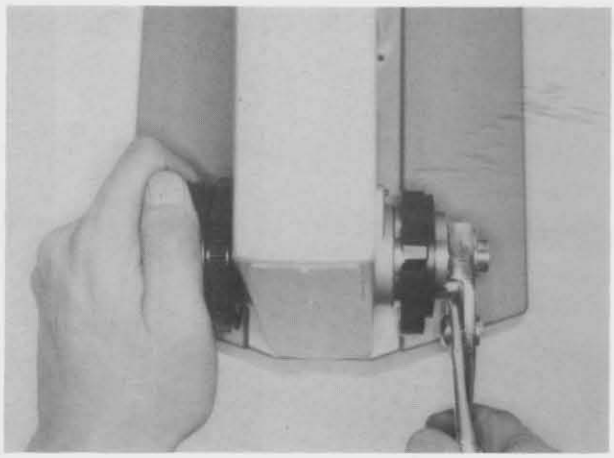


Fig. 3-20

b) While holding the right coarse adjustment knob by hand, turn the shaft holder a little counterclockwise with pliers. After the shaft holder is loosened a little, turn the coarse adjustment knob clockwise. (See Fig. 3-20)

NOTE:
The pre-focusing lever should be unlocked in advance.

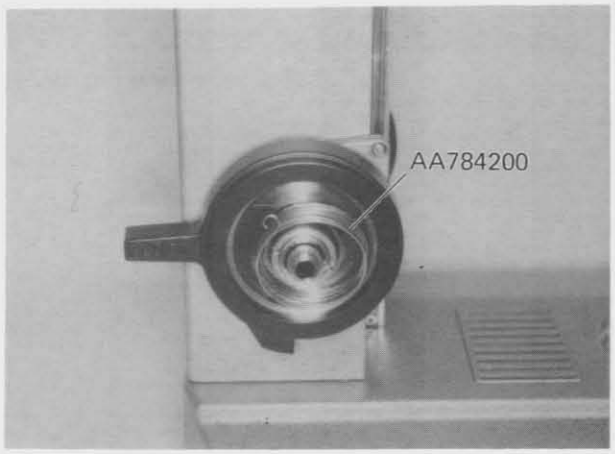


Fig. 3-21

3-5-6 Remove Spring AA784200. (See Fig. 3-21)

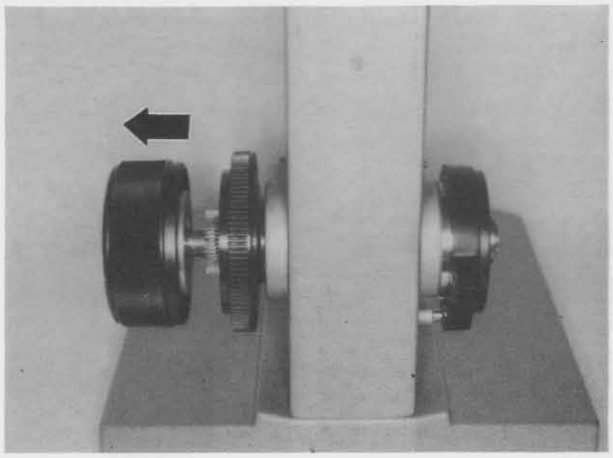


Fig. 3-22

3-5-7 Pull out the right coarse adjustment knob in the direction indicated by arrow.
(See Fig. 3-22)

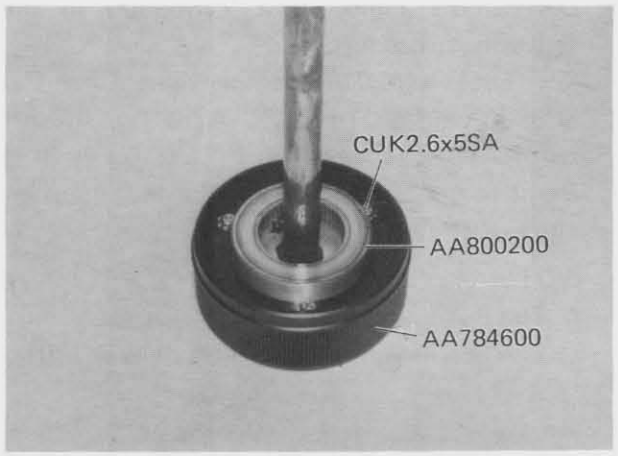


Fig. 3-23

3-5-8 Disassemble the right coarse adjustment knob unit in the following procedures:

a) By removing three Screws CUK2.6x5SA and Washers AA800200, disassemble Coarse adjustment knob AA784600. (See Fig. 3-23)

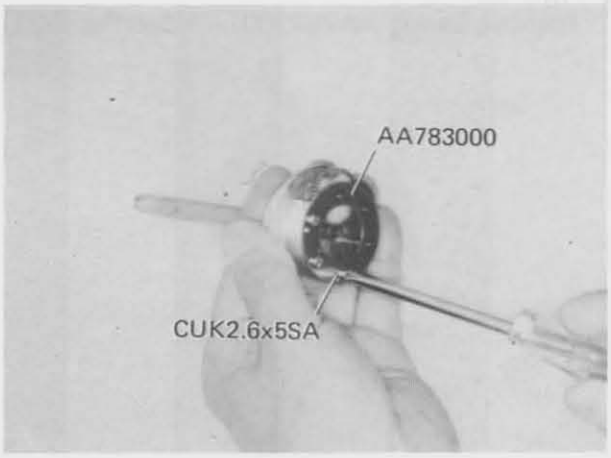


Fig. 3-24

b) By removing three Screws CUK2.6x5SA, detach Circular plate AA783000.
(See Fig. 3-24)

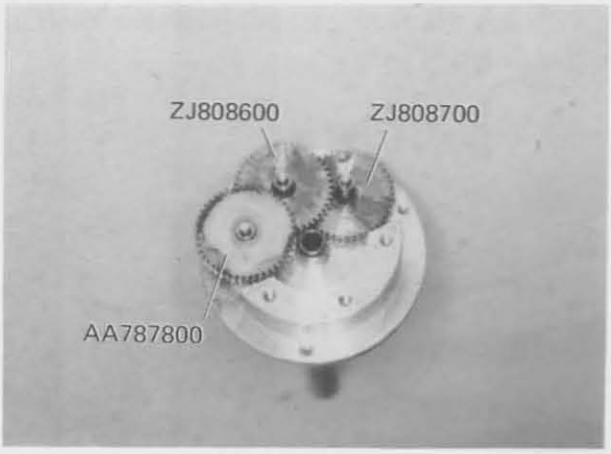


Fig. 3-25

c) Detach gears ZJ808600, ZJ808700 and AA787800. (See Fig. 3-25)

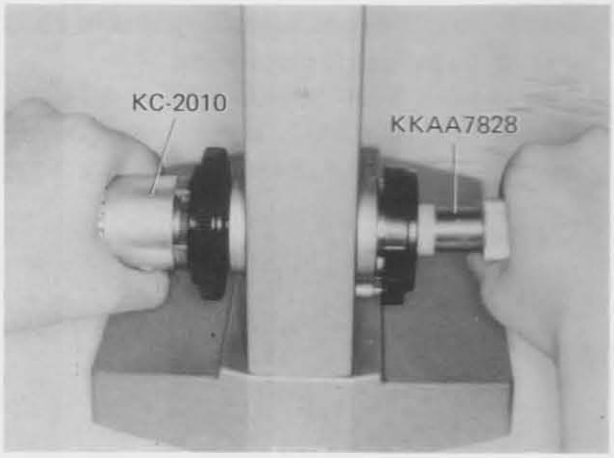


Fig. 3-26

3-5-9 Disassemble Pinion unit ZJ808900 in the following procedures:

a) Set Tool KC-2010 on the right Gear ZJ-808900, and set Tool KKAA7828 on the left Nut AA782800. (See Fig. 3-26)

b) Remove the nut by turning the tool counter-clockwise.

NOTE:

- The nut is fixed with adhesive agent.
- The bearing unit contains 30 Balls B 1/16.

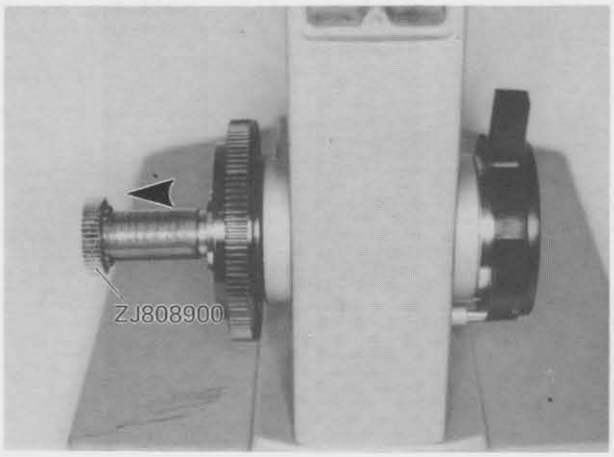


Fig. 3-27

c) Pull out Pinion ZJ808900 in the direction indicated by arrow. (See Fig. 3-27)

d) Remove Balls B 1/16.

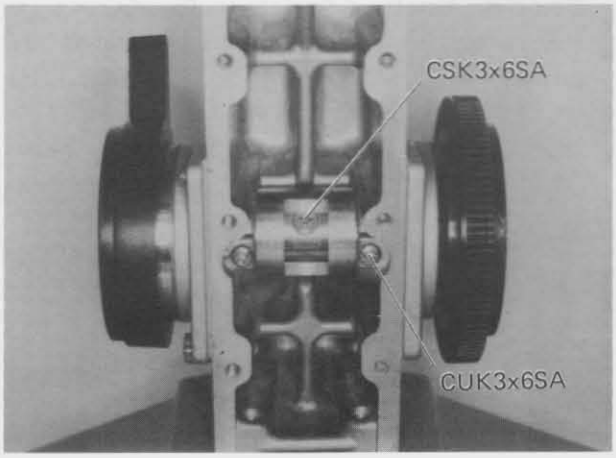


Fig. 3-28

3-5-10 After removing two Screws CUK3x6SA and Screw CSK3x6SA, dismount the pinion bearing.
It can be pulled out in the direction indicated by arrow after the screws have been removed. (See Fig. 3-28)

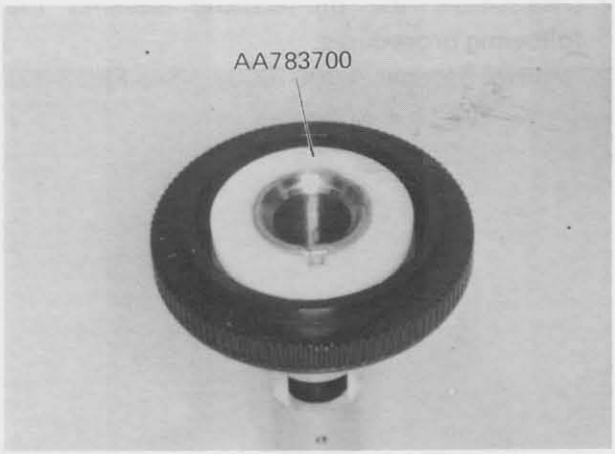


Fig. 3-29

3-5-11 Disassemble the pinion bearing in the procedures given below:

a) Detach Washer AA783700. (See Fig. 3-29)

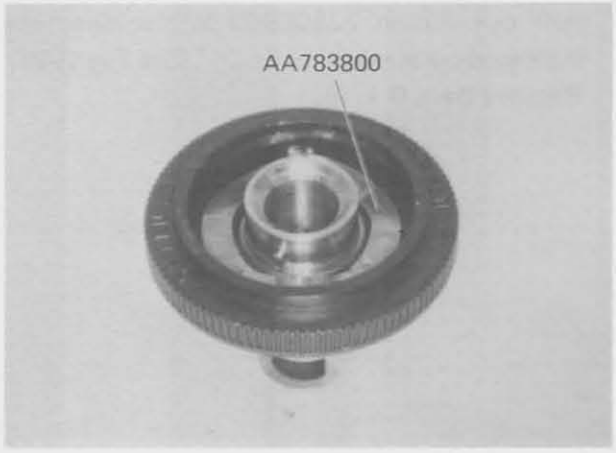


Fig. 3-30

b) Detach Spring AA783800. (See Fig. 3-30)

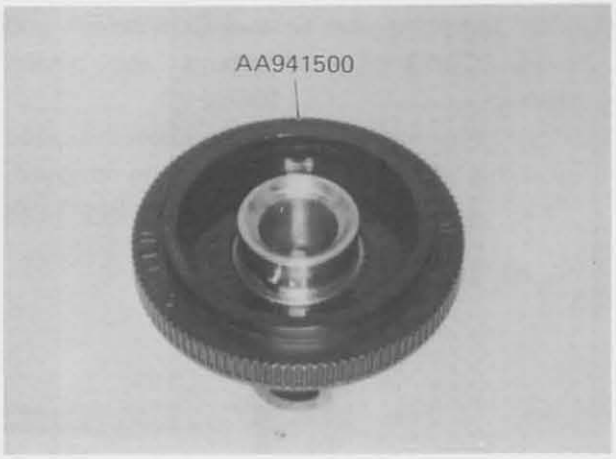


Fig. 3-31

c) Remove Knob AA941500 by turning it clockwise (in the direction indicated by arrow). (See Fig. 3-31)

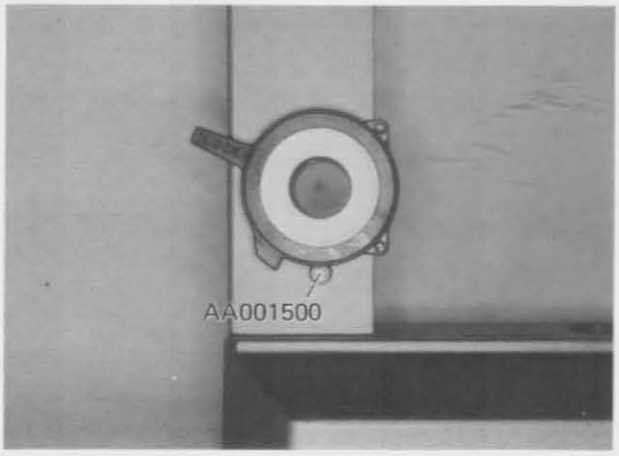


Fig. 3-32

3-5-12 Disassemble the pre-focusing lever in the following procedures:

a) Remove Stopper AA001500. (See Fig. 3-32)

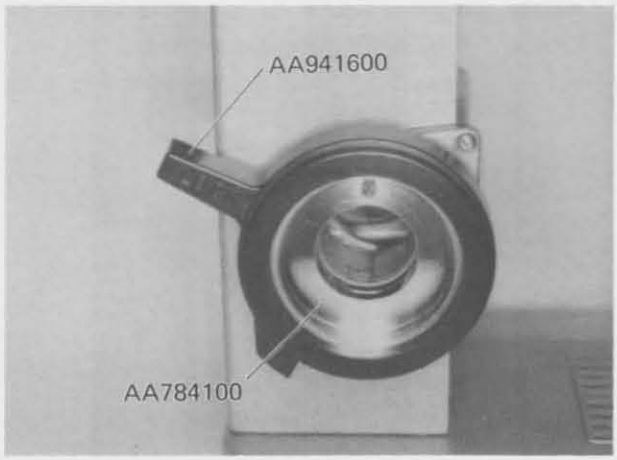


Fig. 3-33

b) Remove Lever AA941600 by turning it counterclockwise. (See Fig. 3-33)

NOTE:

Lever ZJ850000 consists of the following three parts:

Lever	AA941600
Ring	AA784100
Outer ring	AA784000

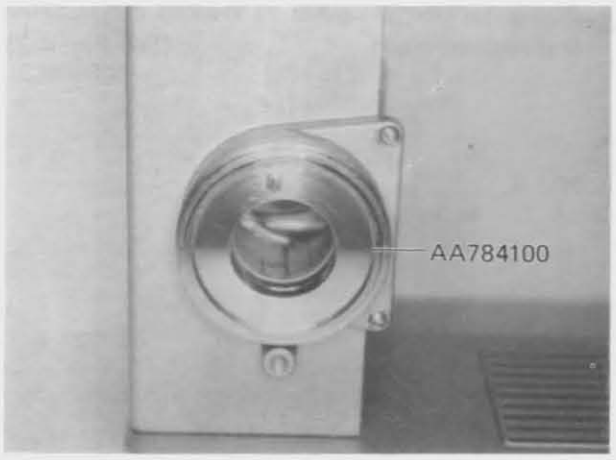


Fig. 3-34

c) Detach Ring AA784100. (See Fig. 3-34)

4. REASSEMBLING PROCEDURES FOR CHA-F-3

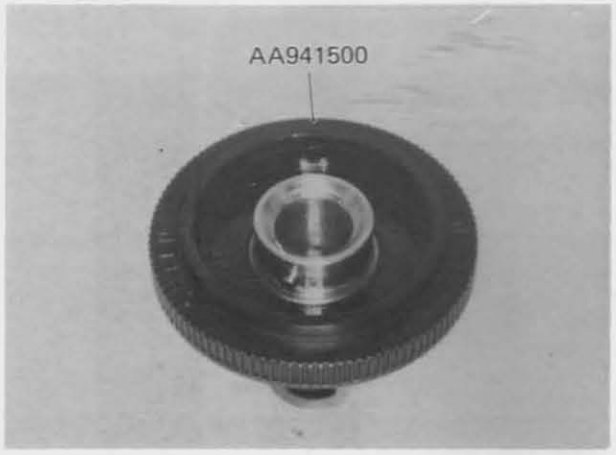


Fig. 4-1

4-1 Reassemble the coarse adjustment knob.

4-1-1 Reassemble the pinion bearing unit in the following procedures:

a) Reassemble Knob AA783800 with Bearing AA782200.
Apply Grease OT2006 to the thread.
(See Fig. 4-1)

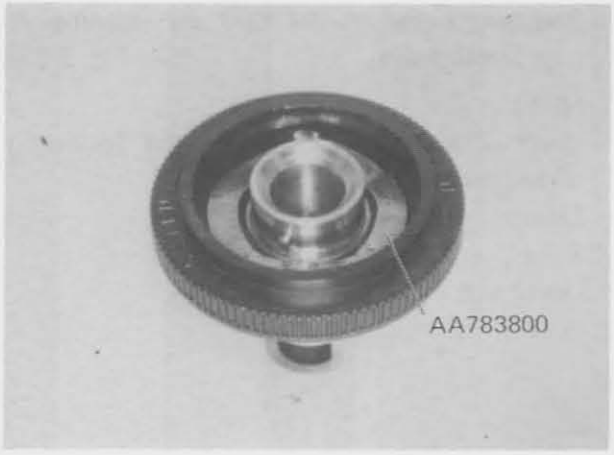


Fig. 4-2

b) Apply Grease OT2006 to the thread crests of Spring AA783800 and reassemble it.
(See Fig. 4-2)

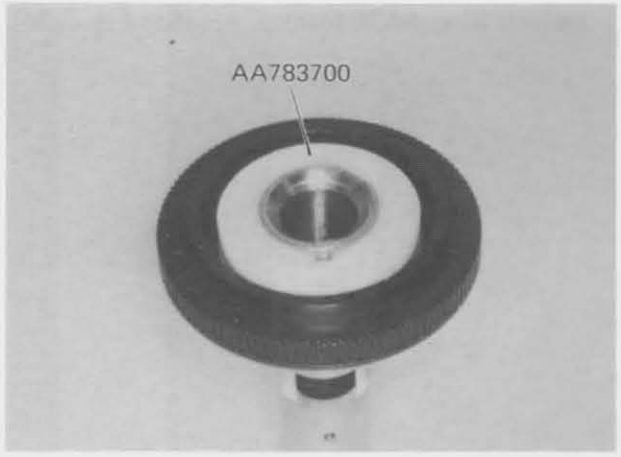


Fig. 4-3

c) Apply Grease OT2006 to Washer AA783700 and reassemble it. (See Fig. 4-3)

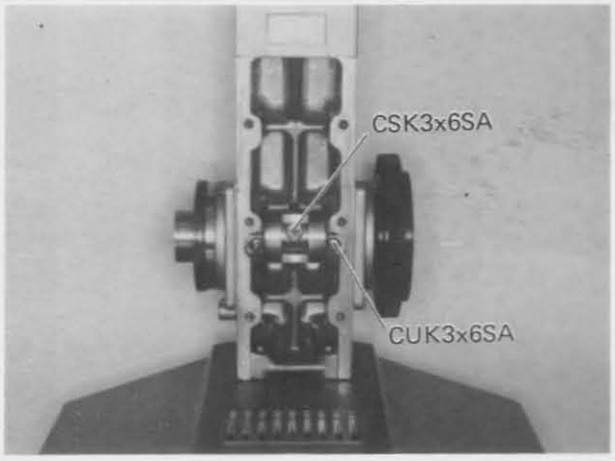


Fig. 4-4

4-1-2 Reassemble the pinion bearing with Arm AA819500 by using two Screws CUK3x6SA and Screw CSK3x6SA. (See Fig. 4-4)

Fig. 4-5

4-1-3 Reassemble Pinion shaft ZJ808900 in the procedures given below:

a) Apply Grease OT2012 to the Pinion shaft ZJ808900. (See Fig. 4-5)

NOTE:

Take care not to apply grease to the thread.

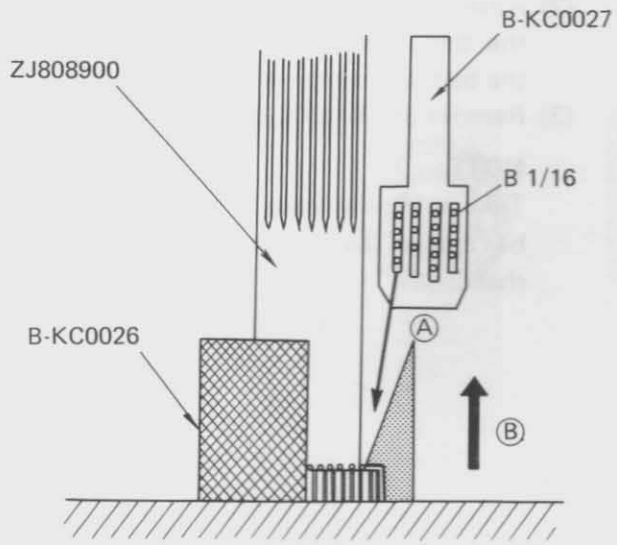


Fig. 4-6

b) Set 30 Balls B 1/16 into the pinion shaft.
(1) Set Jig B-KC0026 on the pinion shaft.
(2) Apply Grease OT2012 to the 30 balls and set them into Jig B-KC0027.
(3) Drop the balls in direction (A).
(4) Pull out Jig B-KC0026 in direction (B). (See Fig. 4-6)

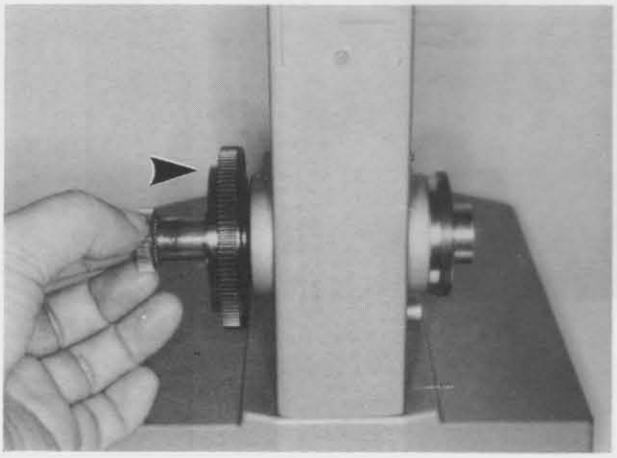


Fig. 4-7

c) Reassemble the pinion shaft with the bearing.
(1) With the microscope stand kept upright, insert the pinion shaft while taking care not to drop the balls.
(2) Fell down the microscope stand while holding the pinion shaft so as not to drop the balls. (See Fig. 4-7)

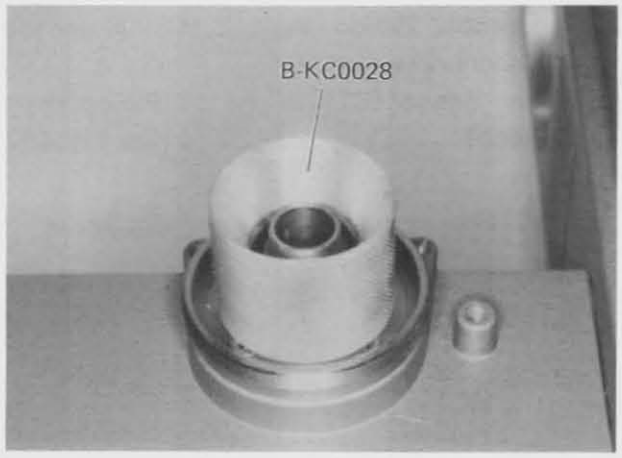


Fig. 4-8

d) Set the 30 Balls B 1/16 by using Jig B-KC 0028.

(1) Set Jig B-KC0028 in position.
(See Fig. 4-8)

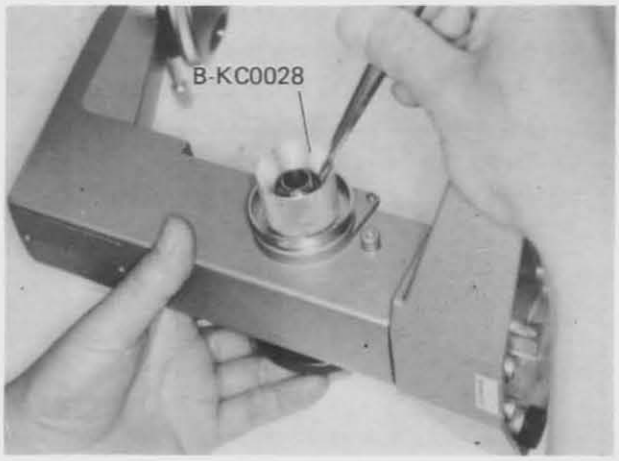


Fig. 4-9

(2) While taking care not to apply grease to the thread of Pinion shaft ZJ808900, set the balls by using tweezers. (See Fig. 4-9)

(3) Remove Jig B-KC0028.

NOTE:
Take sufficient care to prevent grease to be applied to the thread of the pinion shaft.

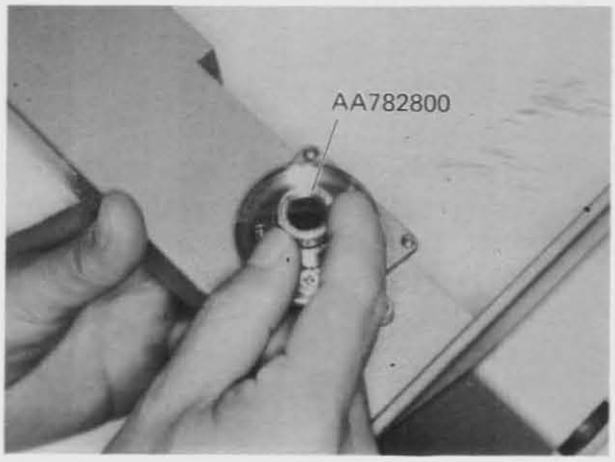


Fig. 4-10

e) Reassemble Nut AA782800 and tighten it to such a degree as to prevent the balls from dropping out. (See Fig. 4-10)

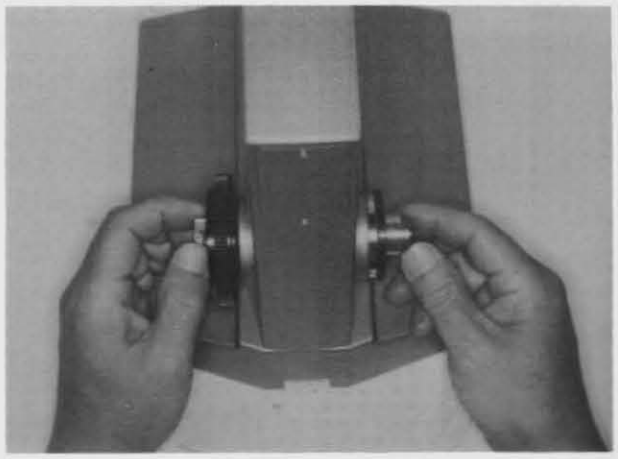


Fig. 4-11

f) Set the microscope stand in its initial position.
Adjust the pinion shaft and Nut AA782800:
(1) Tighten the nut to such a degree that the pinion shaft is free from unsmooth rotation or play in the thrust direction. (See Fig. 4-11)
(2) Note that the pinion shaft cannot rotate smooth if Nut AA782800 is tightened too much.

g) Apply Alon Alpha OT1027 to the thread of Nut AA782800. (See Fig. 4-12)

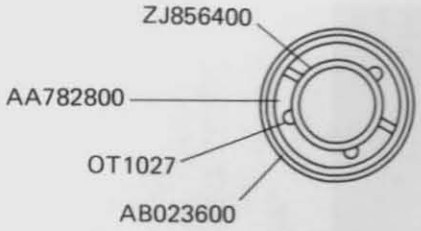


Fig. 4-12

Fig. 4-13

4-1-4 Reassemble the pre-focusing lever:
a) After making sure that Ring AA784100 is free from contamination by oil or flaw, reassemble it in position. (See Fig. 4-13)

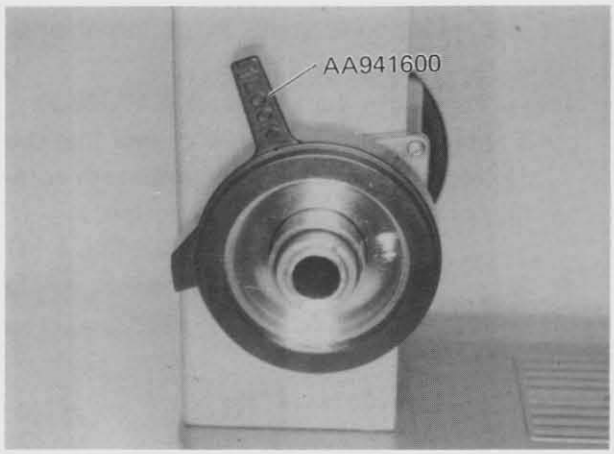


Fig. 4-14

b) Reassemble Lever AA941600 by screwing it clockwise as far as it can turn.
(See Fig. 4-14)

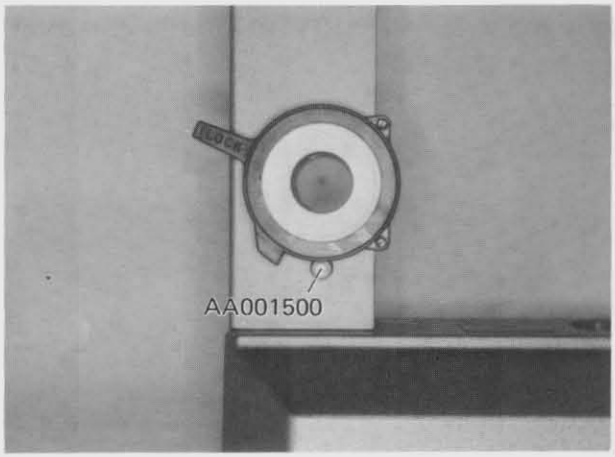


Fig. 4-15

c) Reassemble Stopper AA001500.
(See Fig. 4-15)

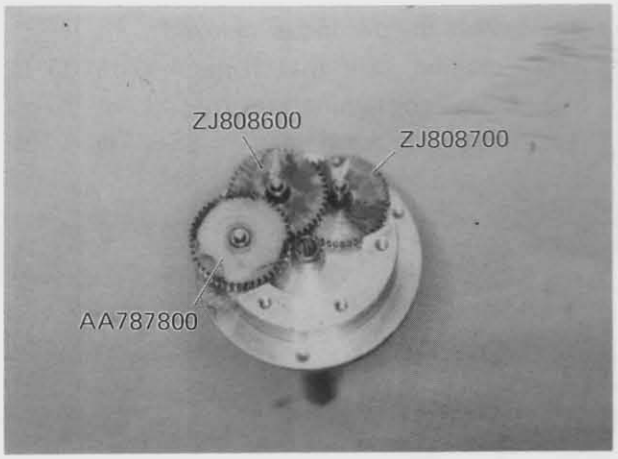


Fig. 4-16

4-1-5 Reassemble the right coarse adjustment knob:

a) Reassemble Gear mount with Gears AA-787800, ZJ808600 and ZJ808700.
Grease OT2012 should preliminarily be applied to the shafts and thread of the gears.
(See Fig. 4-16)

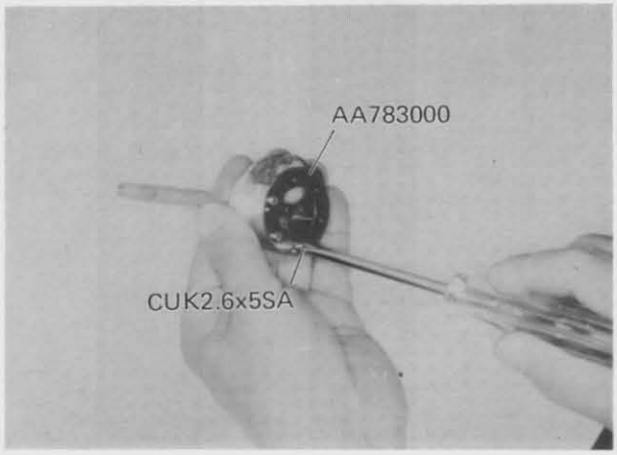


Fig. 4-17

b) Reassemble Cover AA783000 with three Screws CUK2.6x5SA. (See Fig. 4-17)

c) Check the gears for their rotating conditions as described below:

(1) By turning the gears with a finger, make sure that they can turn smooth with no creaking noise.

(2) If the gears cannot turn smooth, check the following items:

- Set condition of Cover AA783000
- Flaw and dust on the gear teeth
- Flaw and burrs on Cover AA783000 and in the bearing hole of Gear mount AA-782900.

Adjust the parts or replace them with new ones if necessary.

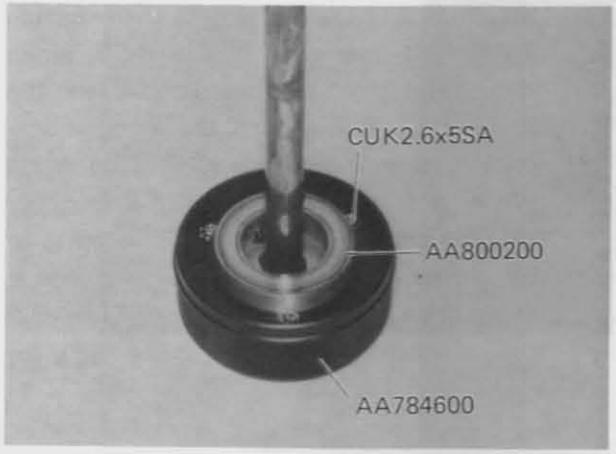


Fig. 4-18

d) Reassemble Coarse adjustment knob AA-784600 with three Screws CUK2.6x5SA and three Washers AA800200. (See Fig. 4-18)

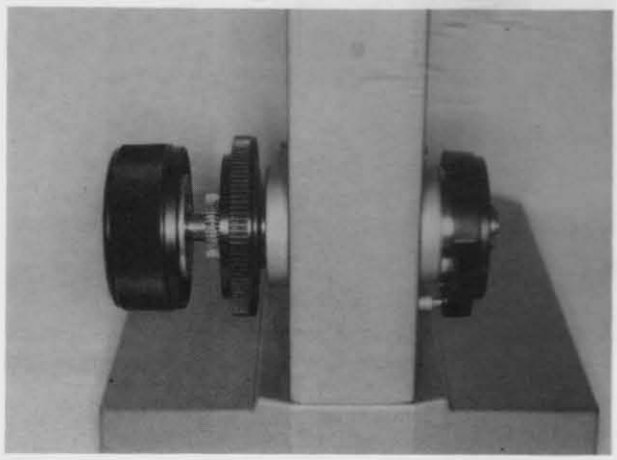


Fig. 4-19

4-1-6 Reassemble the right coarse adjustment knob in the following procedures:

a) Reassemble the knob unit. (See Fig. 4-19)

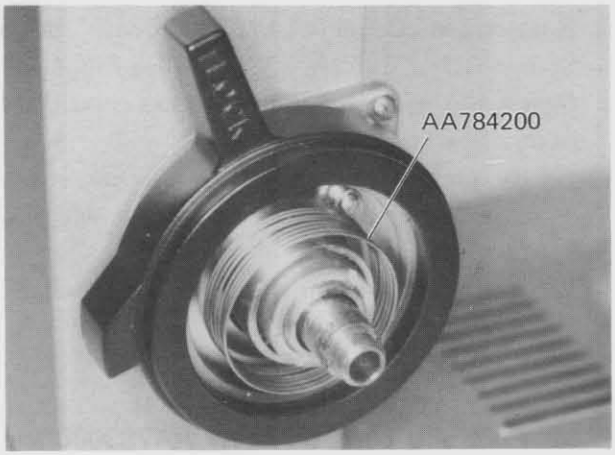


Fig. 4-20

b) Reassemble Spring AA784200. (See Fig. 4-20)

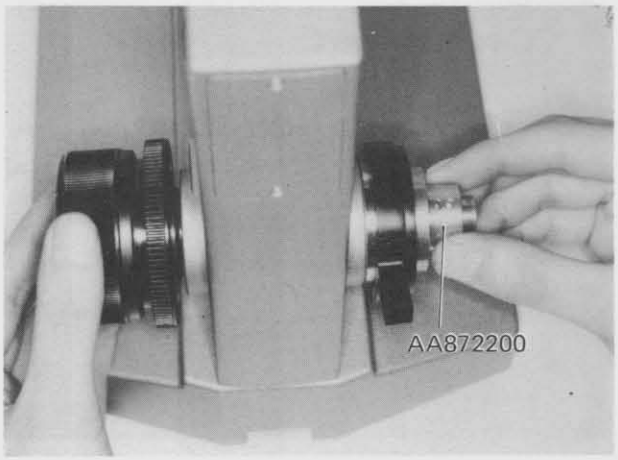


Fig. 4-21

c) Reassemble Bearing AA782200.

(1) Fit Stopper screw AA146300 located on Bearing AA872200 into the circular part attached at the other end of Spring AA784200 as shown in Fig. 4-20. While depressing the bearing lightly to the microscope stand, turn the knob clockwise as far as it can go. (Fig. 4-21) When it is stopped, ride the knob over the stopper while allowing the bearing to be a little apart from the microscope stand once again. (See Fig. 4-22)

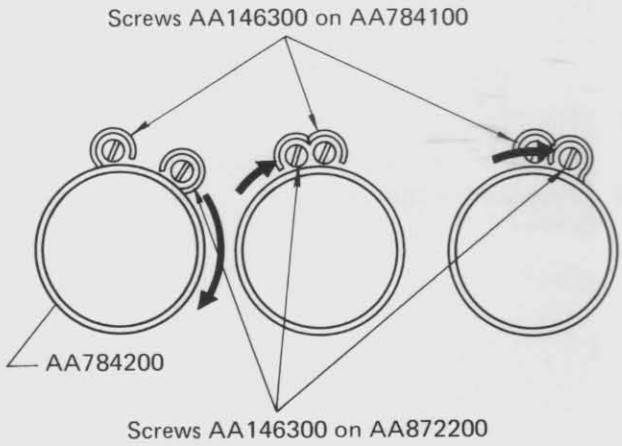


Fig. 4-22

Reassembly of the coarse adjustment knob should be performed in the sequence of A → B → C illustrated in Fig. 4-22.

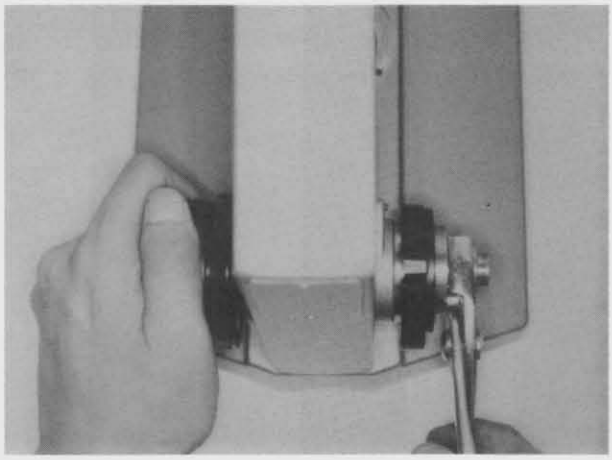


Fig. 4-23

(2) With the bearing depressed lightly to the microscope stand by hand, tighten the right coarse adjustment knob by turning it clockwise. Finally, tighten it firmly while holding the bearing with pliers or the similar tool. (See Fig. 4-23)

NOTE:
Coarse adjustment knob AA784600 cannot turn smooth unless Gear ZJ808900 assembled in the gear mount is engaged properly with Pinion ZJ808900 in tightening the knob.

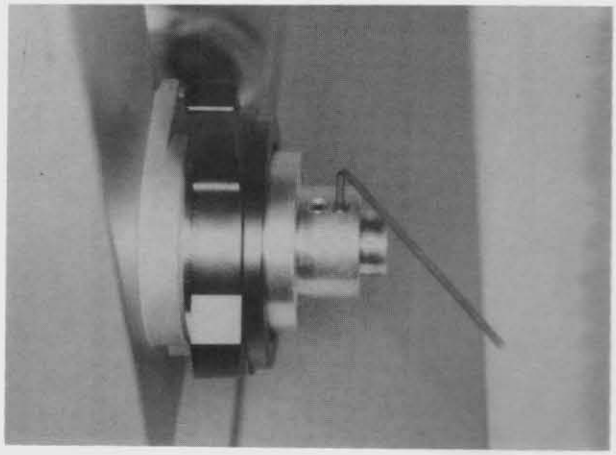


Fig. 4-24

(3) Tighten two Setscrews ACU3x5SA on Bearing AA872200. (See Fig. 4-24)

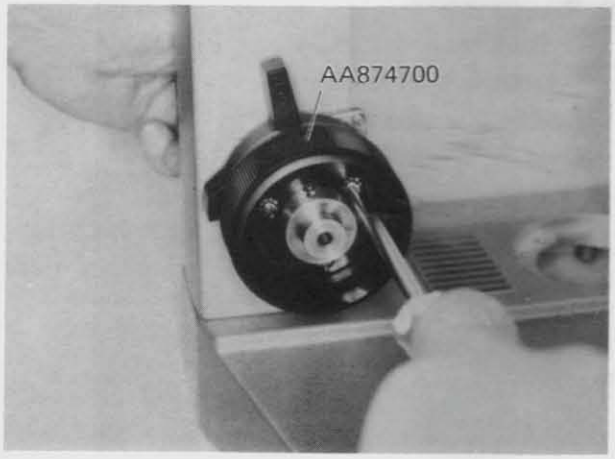


Fig. 4-25

4-1-7 Reassemble Coarse adjustment knob AA-874700 with three Screws CUK2.6x5SA and three Washers AA800200. (See Fig. 4-25)

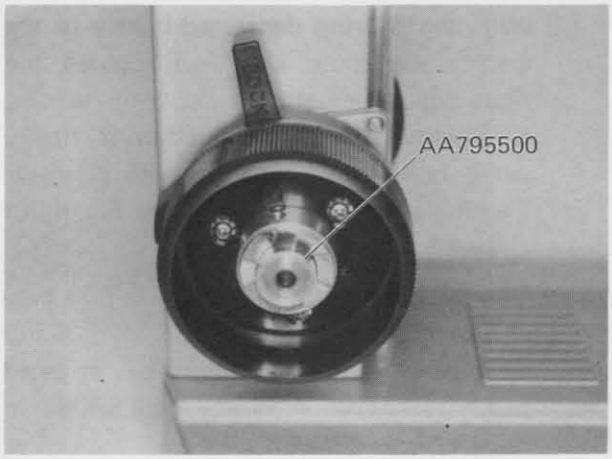


Fig. 4-26

4-1-8 Reassemble Spring AA795500. Grease OT-2008 should preliminarily be applied to the thread crests of the spring. (See Fig. 4-26)

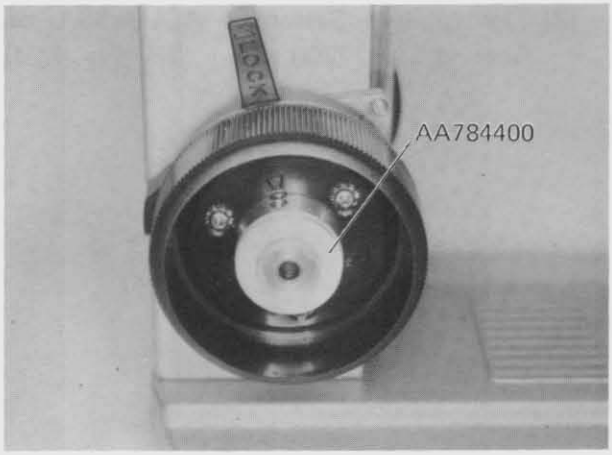


Fig. 4-27

4-1-9 Reassemble Washer AA784400. Grease OT-2008 should preliminarily be applied to the washer. (See Fig. 4-27)

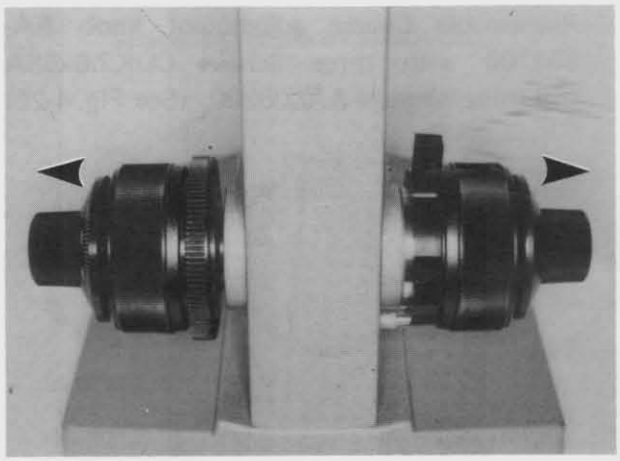


Fig. 4-28

4-1-10 Reassemble the fine adjustment knob in the procedures given below:

a) Insert the right knob unit:

Knob	AA874800
Gear	AA782600
Shaft	AA783000

b) Reassemble the left knob AA784800. (See Fig. 4-28)

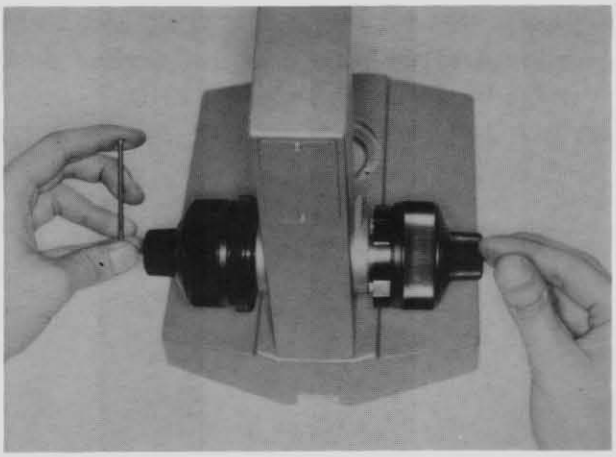


Fig. 4-29

c) Tighten right and left Screws AB3x6SA. (See Fig. 4-29)

Fig. 4-30

4-1-11 Reassemble right and left Plates AA785000. (See Fig. 4-30)

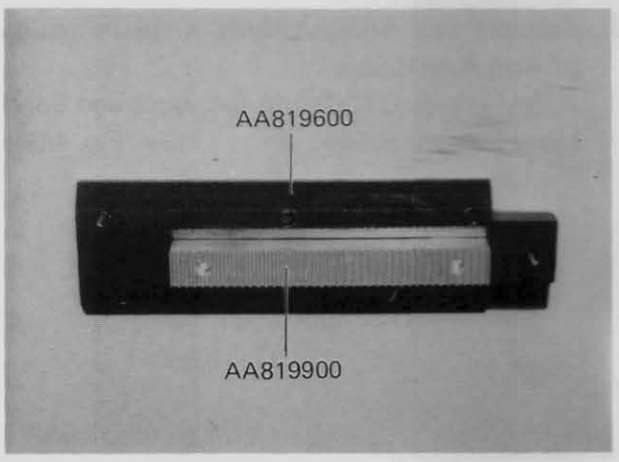


Fig. 4-31

4-2 Reassembling procedures for coarse adjustment guide.

NOTE:
For reassembling the coarse adjustment guide of CHA-F (old type), proceed to 10-2 of this manual.

4-2-1 Reassemble Inner guide unit AA819600.

a) Temporarily reassemble Rack AA819900 with Inner guide AA819600. (See Fig. 4-31)

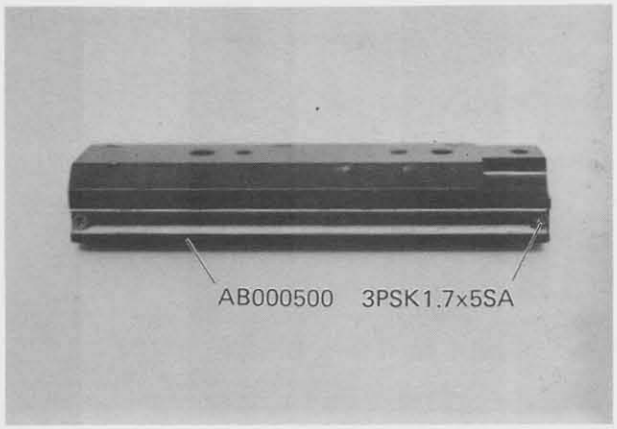


Fig. 4-32

b) Reassemble two Wires AB000500 with Inner guide AA819600 by using two Screws 3PSK 1.7x5SA and apply Grease OT2010.
(See Fig. 4-32)

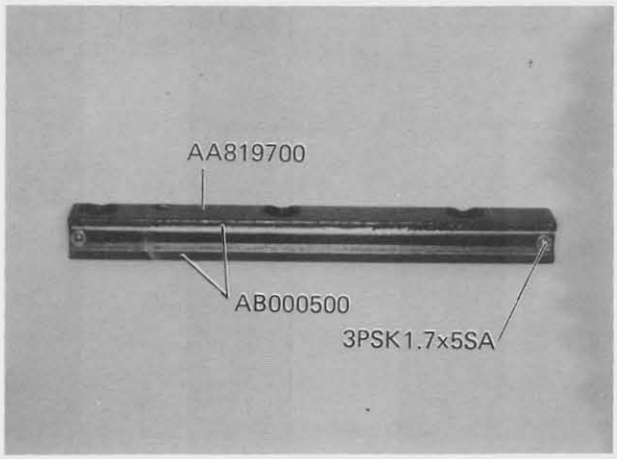


Fig. 4-33

4-2-2 Reassemble two Wires AB000500 with Inner guide AA819700 by using two Screws 3PSK 1.7x5SA and apply Grease OT2010.
(See Fig. 4-33)

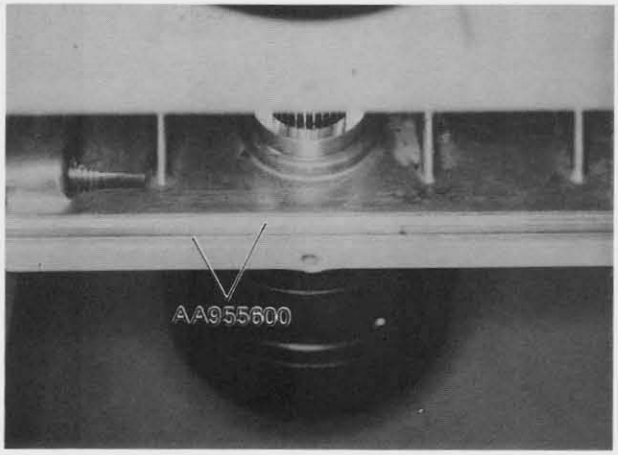


Fig. 4-34

4-2-3 Connect four Wires AA955600 to the guide of Arm AA819500.
Apply grease OT2010 to the wires and bond them for connection. (See Fig. 4-34)

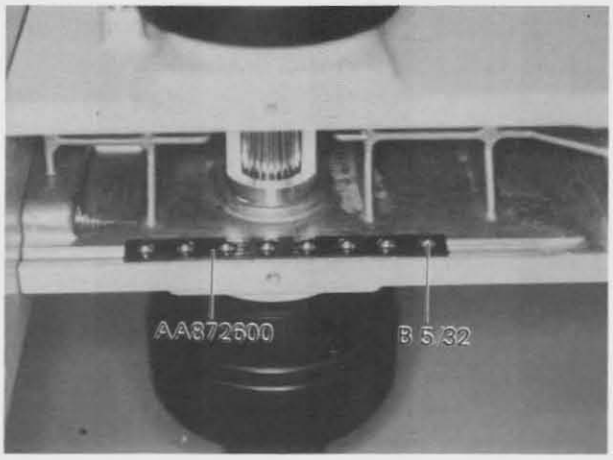


Fig. 4-35

4-2-4 Mount Casing AA872600 and eight Balls B 5/32. (See Fig. 4-35)

- Apply Grease OT2010 to the balls in advance.
- The casing should be centered with the pinion.

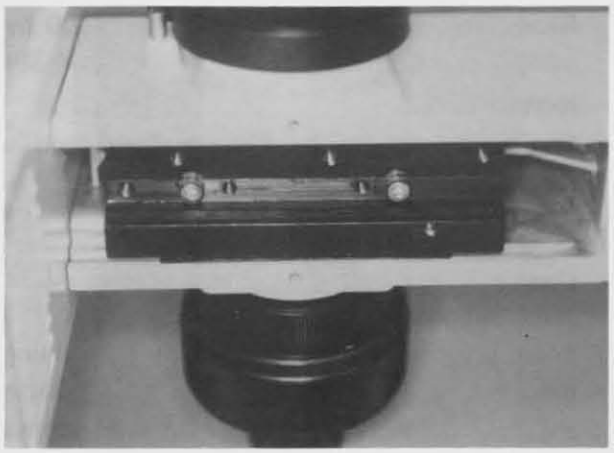


Fig. 4-36

4-2-5 Reassemble the inner guide unit prepared in step 4-2-1 above. (See Fig. 4-36)

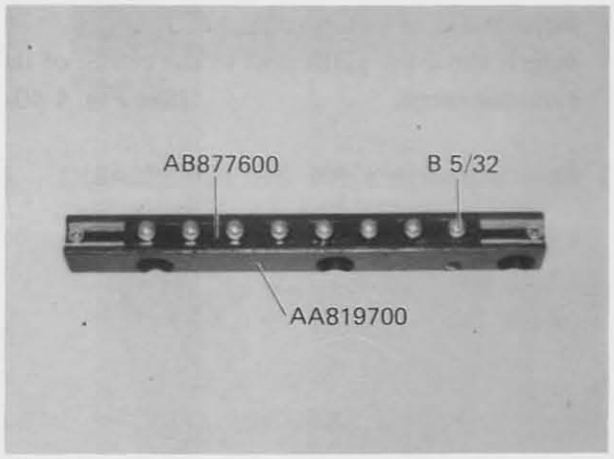


Fig. 4-37

4-2-6 Reassemble the inner guide unit prepared in step 4-2-2 above.

a) Mount Casing AA872600 and eight Balls B 5/32 on the Inner guide AA819700. (See Fig. 4-37)

This step is quite similar to 4-2-4 above.

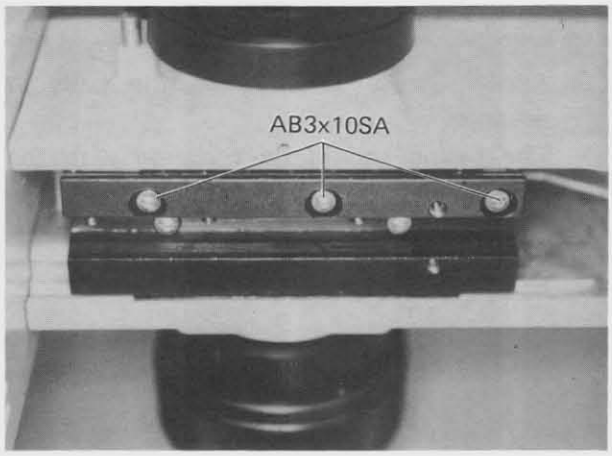


Fig. 4-38

b) Reassemble the Inner guide in alignment with that reassembled in step 4-2-5 above.
(See Fig. 4-38)

NOTE:
The inner guide should be fixed by tightening Screw AB3x10SA, and then loosened about half a turn (180°).

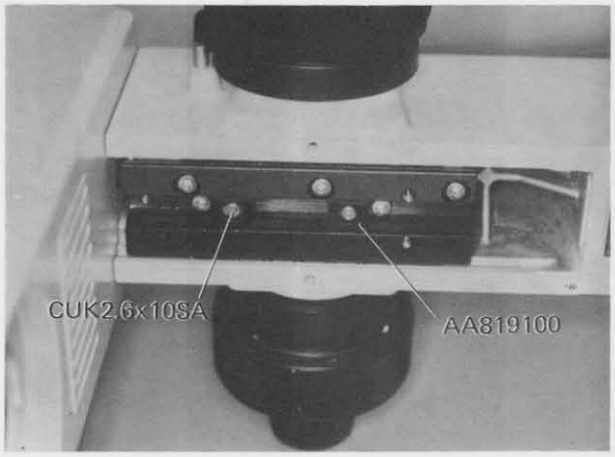


Fig. 4-39

4-2-7 Reassemble two Fixing pieces AA819800 by using Screw CUK2.6x10SA. (See Fig. 4-39)

NOTE:
The screw should be tightened to such a degree that the guide is free from play.

4-2-8 Adjust Rack AA819900.
a) Loosen about half a turn two Screws AB3x 10SA which are used for fixing the rack.
b) After positioning the rack snugly by moving the inner guide up and down with the coarse adjustment knob, firmly tighten two Screws AB3x10SA.

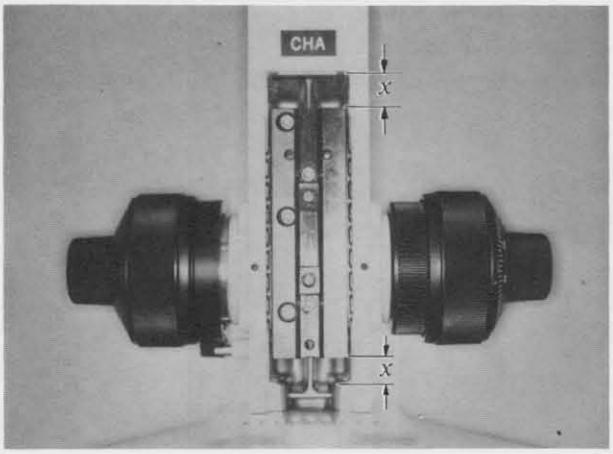


Fig. 4-40

4-2-9 Adjustment of inner guide unit
a) Adjust the inner guide unit to the center of its movable range. (See Fig. 4-40)

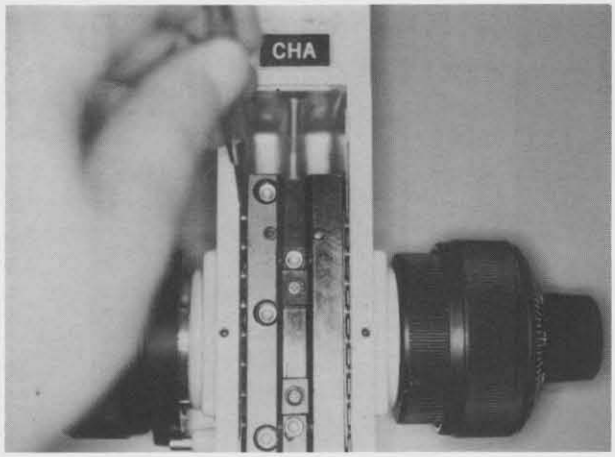


Fig. 4-41

b) By using a screwdriver or tweezers, adjust the casing to the center of the inner guide unit. (See Fig. 4-41)

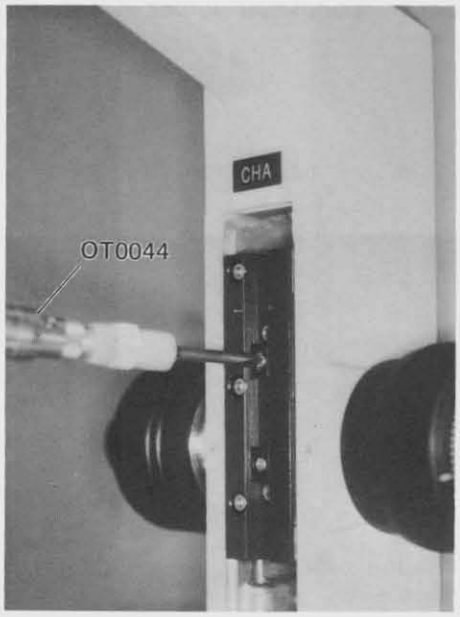


Fig. 4-42

c) By using Torque screwdriver OT0044, tighten two Setscrews CUK2.6x10SA for the fixing piece. (See Fig. 4-42)
Tightening torque: 800 g-cm

d) Apply Shellac OT1131 to the screws to prevent loosening.

e) Finally fix Inner guide AA819700 by tightening three Screws AB3x10SA.

5. DISASSEMBLING PROCEDURES FOR C-CH CONDENSER HOLDER

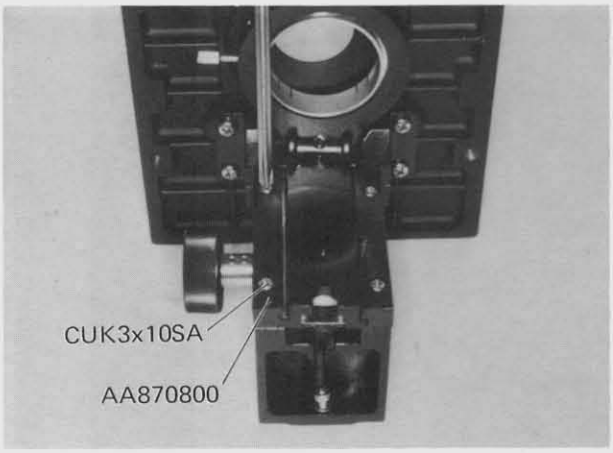


Fig. 5-1

5-1 By removing two Screws CUK3x10SA, dismount left Dovetail AA870800. (See Fig. 5-1)

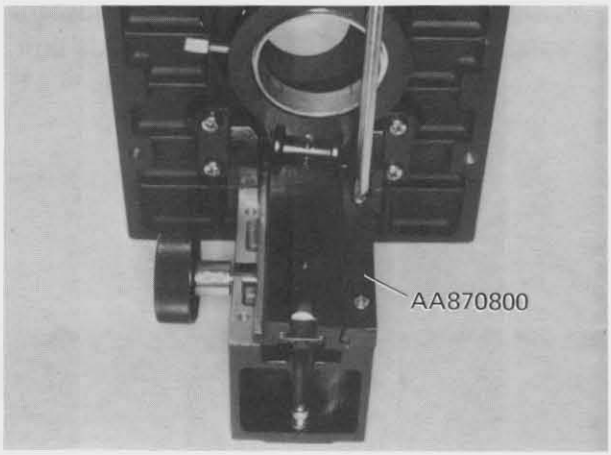


Fig. 5-2

5-2 By removing two Screws CUK3x10SA, dismount right Dovetail AA870800. (See Fig. 5-2)

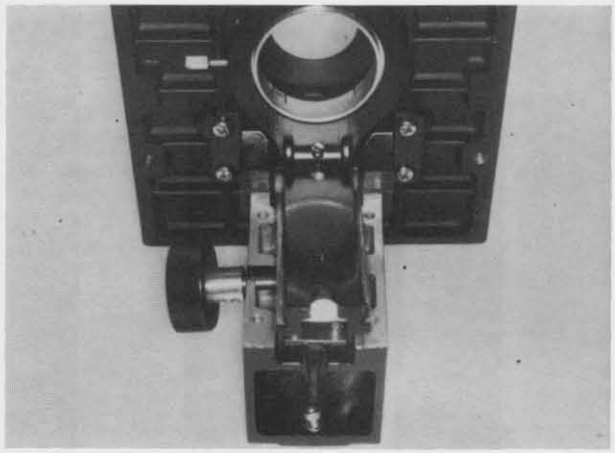


Fig. 5-3

5-3 Dismount the condenser holder. (See Fig. 5-3)

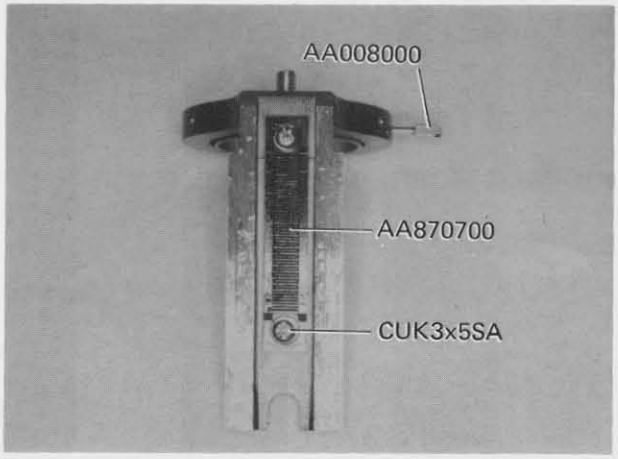


Fig. 5-4

5-4 Disassembling procedures for condenser holder.

5-4-1 By removing two Screws CUK3x5SA, dismount Rack AA870700. (See Fig. 5-4)

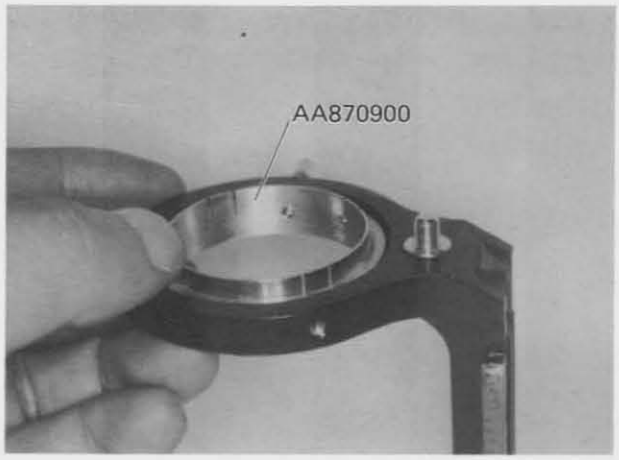


Fig. 5-5

5-4-2 Detach Sleeve AA870900. (See Fig. 5-5)

NOTE:
Sleeve AA870900 should be detached to correct the following defects only:
(1) Miscentering of condenser
(2) Breakage of Sleeve AA870900

a) Remove Setscrew AA008000.
b) Loosen three Screws NU3x6SA.
c) Detach Sleeve AA870900.

5-4-3 Remove Condenser height adjusting screw HU5x14SA.

NOTE:
The height adjusting screw should be removed only when the condenser height is misadjusted.

a) Remove Nut NN5SA.
b) Remove Screw HU5x14SA. (See Fig. 5-5)

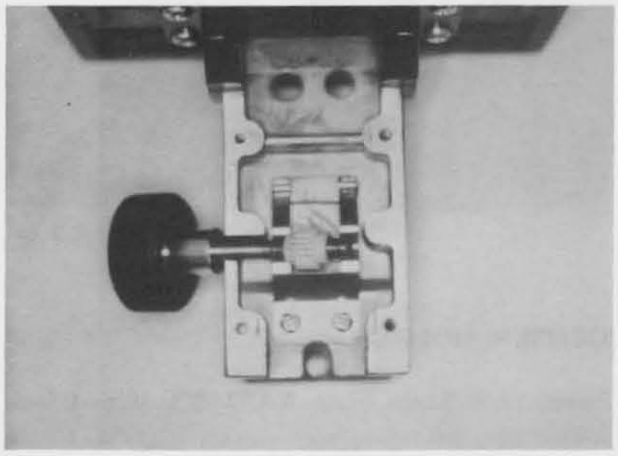


Fig. 5-6

5-4-4 Disassemble Pinion AA871100. (See Fig. 5-6)

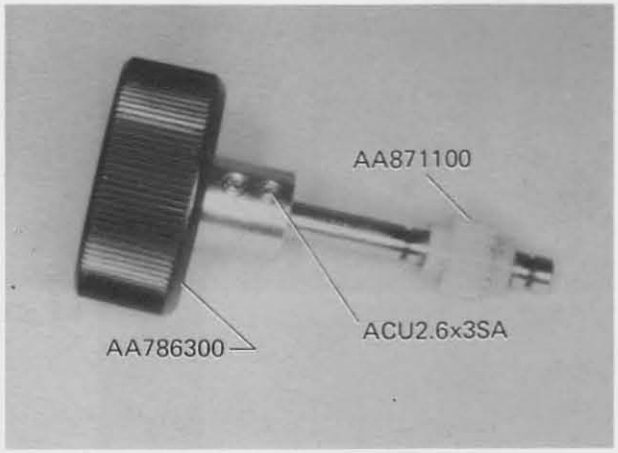


Fig. 5-7

5-4-5 Detach Knob AA786300 from Pinion AA-871100 by removing two Screws ACU2.6x 3SA. (See Fig. 5-7)

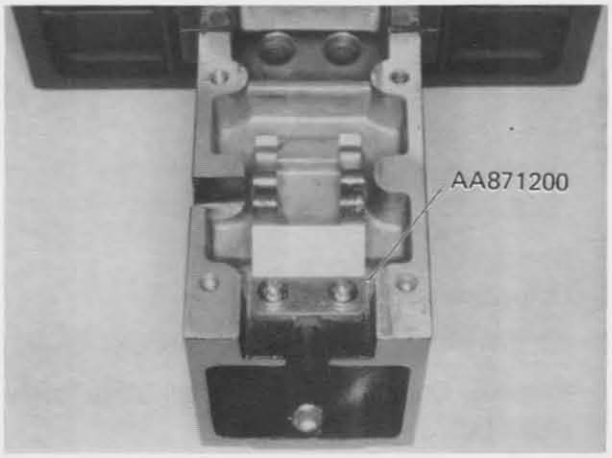


Fig. 5-8

5-4-6 Dismount Pinion holder AA871200 by removing two Screws CUK3x5SA.
(See Fig. 5-8)

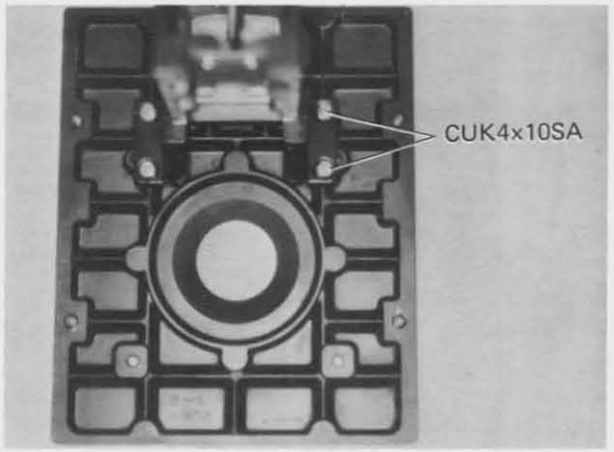


Fig. 5-9

5-4-7 Detach Stage plate AA871800 by removing four Screws CUK4x10SA. (See Fig. 5-9)

NOTE:
The stage plate should be detached only when it is defective or its perpendicularity is improper.

6. REASSEMBLING PROCEDURES FOR C-CH CONDENSER HOLDER

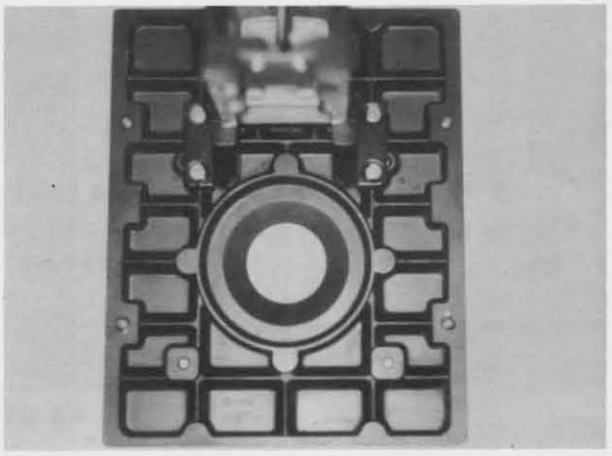


Fig. 6-1

6-1 Reassemble Stage plate AA871800 with Block AA870500 by using four Screws CUK4x10SA.
(See Fig. 6-1)

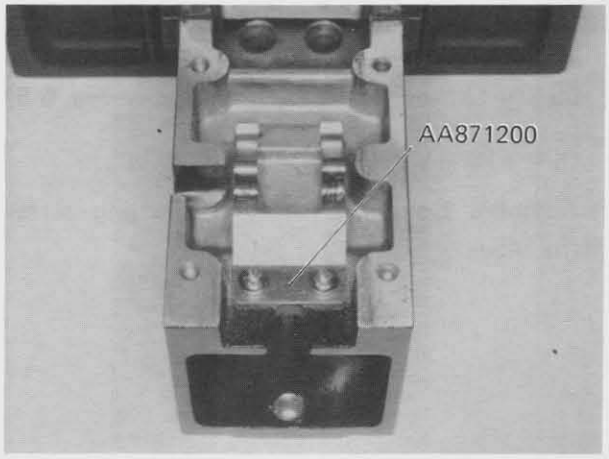


Fig. 6-2

6-2 Reassemble Pinion holder AA871200 by using two Screws CUK3x5SA. (See Fig. 6-2)

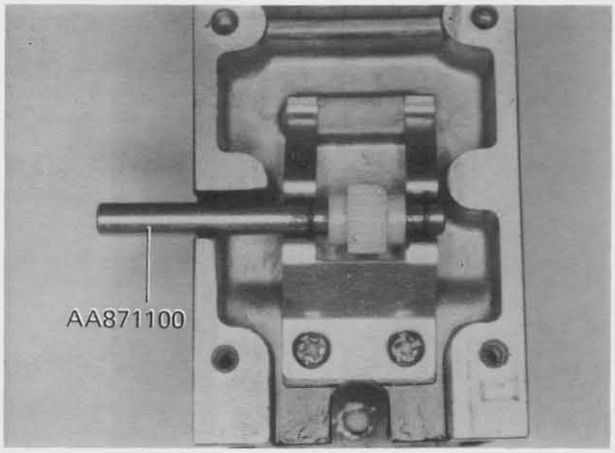


Fig. 6-3

6-3 Set Pinion AA871100 in position. (See Fig. 6-3)

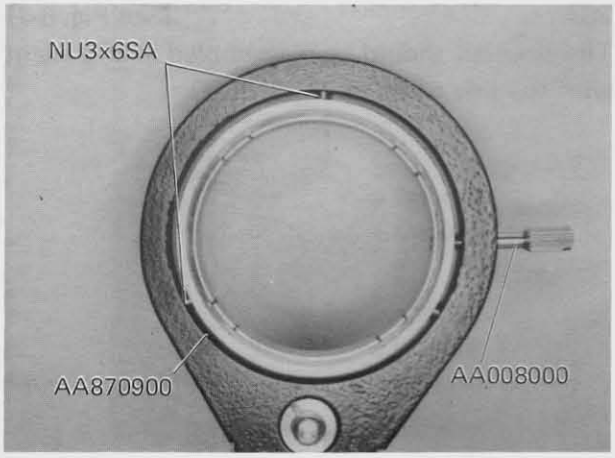


Fig. 6-4

6-4 Reassembling procedures for condenser holder unit.

6-4-1 Reassemble Sleeve AA870900 with Condenser holder AA870600 by using three Screws NU3x6SA. (See Fig. 6-4)

6-4-2 Reassemble Setscrew AA008000.

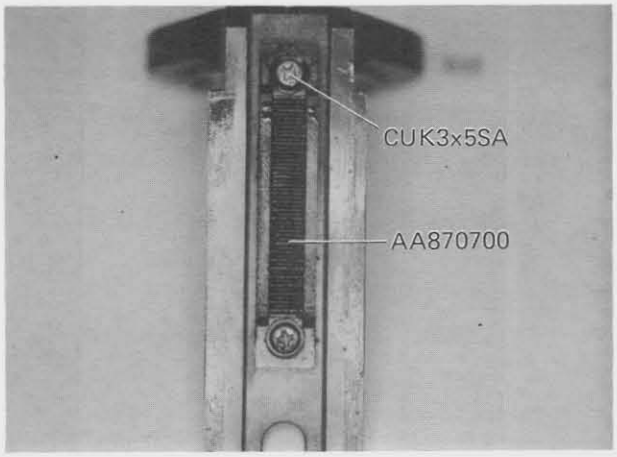


Fig. 6-5

6-4-3 Reassemble Rack AA870700 by using two Washers SW 3SA and two Screws CUK3x 5SA. (See Fig. 6-5)

6-4-4 Apply Grease OT2008 to the dovetail.

6-5 Reassemble Condenser height adjusting screw HU5x14SA.

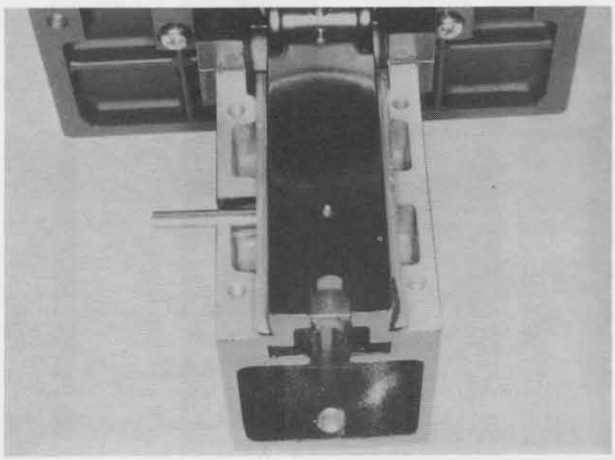


Fig. 6-6

6-6 Set the condenser holder unit in position. (See Fig. 6-6)

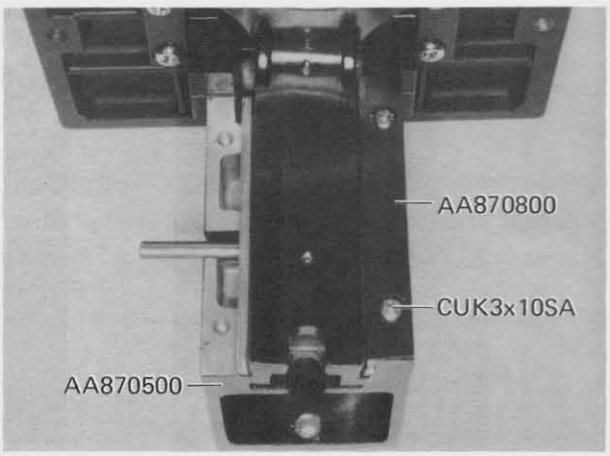


Fig. 6-7

6-7 Reassemble right Dovetail AA870800 by using two Screws CUK3x10SA and two Washers SW 3SA. (See Fig. 6-7)
The dovetail should be reassembled in alignment with the side of Block AA870500.

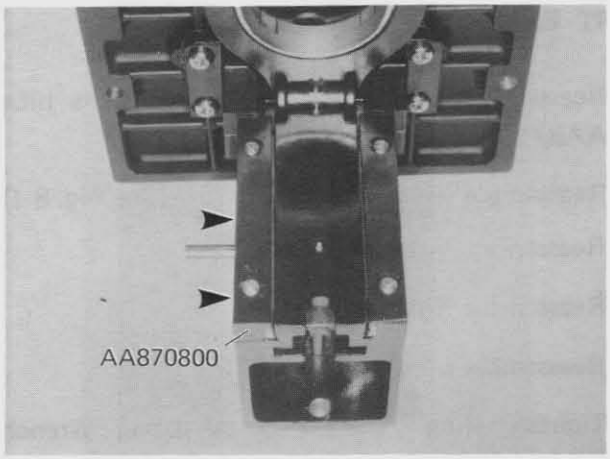


Fig. 6-8

6-8 Reassemble left Dovetail AA870800 by using two Screws CUK3x10SA and two Washers SW 3SA. (See Fig. 6-8)
While pushing the dovetail uniformly in the direction indicated by arrows, tighten the screws.

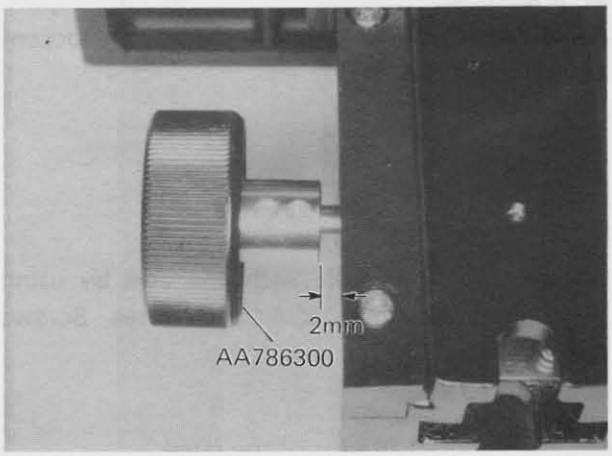


Fig. 6-9

6-9 Reassemble Knob AA876300 by using two Screws ACU2.6x3SA.
The knob should be apart about 2 mm.
(See 6-9)

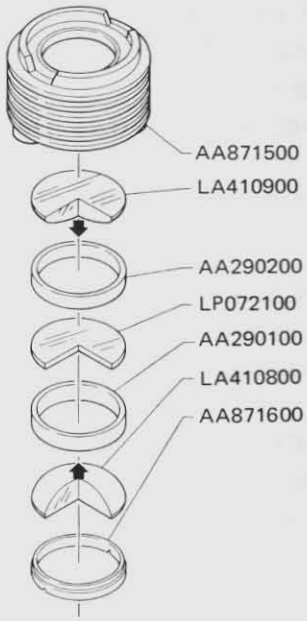
6-10 Check the condenser holder for its vertical motion.

6-10-1 Check the dovetail for its play.

a) When the tip of the condenser holder is swung in the right-left direction, play must not be felt by hand.

b) If the dovetail plays, tighten the two screws firmly while depressing the left dovetail sufficiently in the direction indicated by arrow. (See step 6-8 above)

7. DISASSEMBLING PROCEDURES FOR C-CL LIGHT EXIT



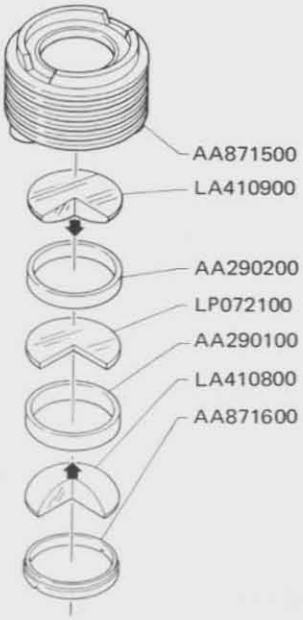
7-1 Remove Ring AA871600.

NOTE:
The ring is bonded at one point with Araldite. If it cannot be loosened with the Pin face wrench KKAA8716, cut off Araldite by using tweezers or the similar tool.

7-2 Disassemble the lens system:

Lens	LA410800
Ring	AA290100
Filter	LP072100
Ring	AA290200
Lens	LA510900

8. REASSEMBLING PROCEDURES FOR C-CL LIGHT EXIT



8-1 Reassemble Lens AA410900 with Lens tube AA871500.

8-2 Reassemble Ring AA290200. (See Fig. 8-1)

8-3 Reassemble Filter LP072100.

8-4 Reassemble Ring AA290100.

8-5 Reassemble Lens LA410800.

8-6 Tighten Ring AA871600 by using Wrench KKAA8716.

8-7 Loosen Ring AA871600 to such a slight degree as not to allow the lens to play, and apply Araldite OT1028 at a point to prevent loosening.

9. OVERALL ASSEMBLY AND ADJUSTMENT

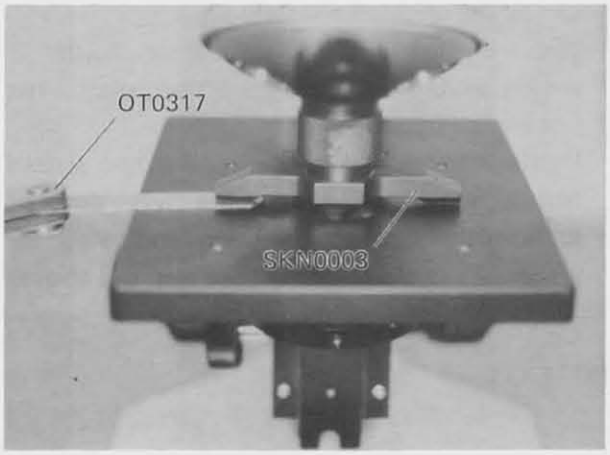


Fig. 9-1

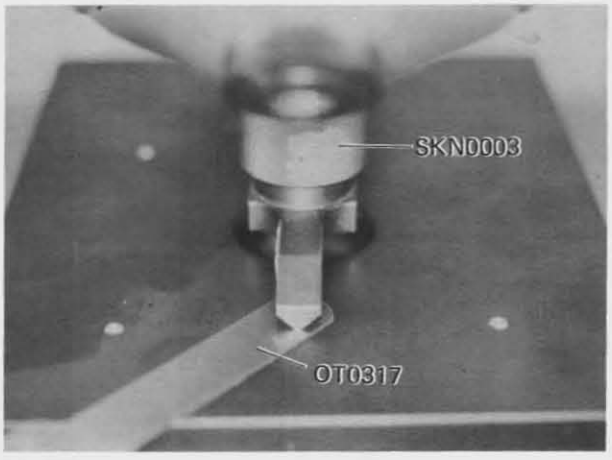


Fig. 9-2

9-1 Reassemble C-CH unit with the arm by using three Screws AB3x10SA and three Screws AA800300.
See step 3-3 above.

9-2 Adjust perpendicularity of the stage.

9-2-1 Adjust in X direction

a) Set Stage perpendicularity gauge SKN0003 on the nose piece.

b) Apply SKN0003 on the stage surface in the X direction.

c) Measure gaps in the X direction by using Thickness gauge OT0317 between SKN0003 and stage surface. (See Fig. 9-1)
Standard: Within 0.15 mm

d) If the standard is not satisfied, adjust position of C-CH by turning three Setscrews AB3x 10SA.

9-2-2 Adjustment in Y direction

a) Proceed as described in 9-2-1-b) above.

b) Proceed as described in 9-2-1-c) above. (See Fig. 9-2)

c) If the standard is not satisfied, adjust by inserting tin foil between Stage plate AA-871800 and Block AA870500.

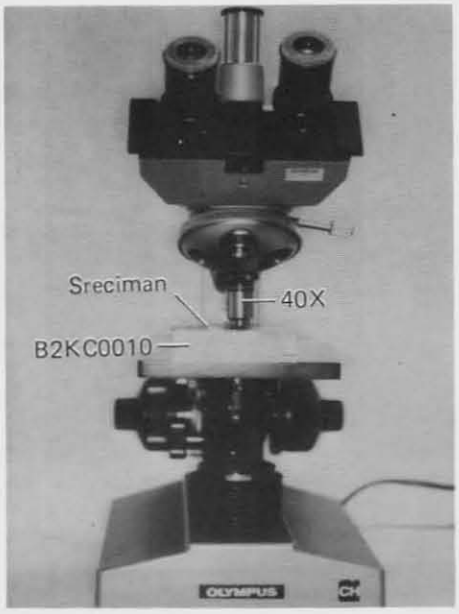


Fig. 9-3

9-3 Reassemble Light exit C-CL by using three Screws CUK3x6SA.

NOTE:
The notches formed in the light exit must be positioned on the front and rear as shown in Fig. 3-3.

9-4 Reassemble Electric base plate C-BDA.
(See Fig. 3-2)

9-5 Check and adjustment of fine adjustment sensitivity.

9-5-1 Set the following accessories and checking components in the microscope as shown in Fig. 9-3.

Microscope tube
Objective 40x
Eyepiece 10x
} Need not be of specific types

Condenser
Specimen (matched with objective 40x)
Block B2KC0010

9-5-2 Check fine adjustment sensitivity in the following procedures:

a) Bring the specimen into focus and read indication on the fine adjustment scale.

b) Turn the fine adjustment knob ±25 μ (10 divisions) and bring the specimen into focus once again. Then read indication on the fine adjustment scale once again.
Difference between readings obtained in step a) and b) must be within 1.5 divisions.

c) Remove Block B2KC0010, and then carry out steps a) and b) above.

9-5-3 When the standard is not satisfied:

a) Check the pinion shaft (assembled in 4-1-3) for its assembled condition and parts.

b) Check the right coarse adjustment knob (assembled in 4-1-5) for its assembled condition and parts (especially the gears).

c) Check the right coarse adjustment knob unit for its assembled condition.

For details, refer to the steps mentioned in the above parentheses.

10. DISASSEMBLING AND REASSEMBLING PROCEDURES FOR CHA-F (OLD TYPE)

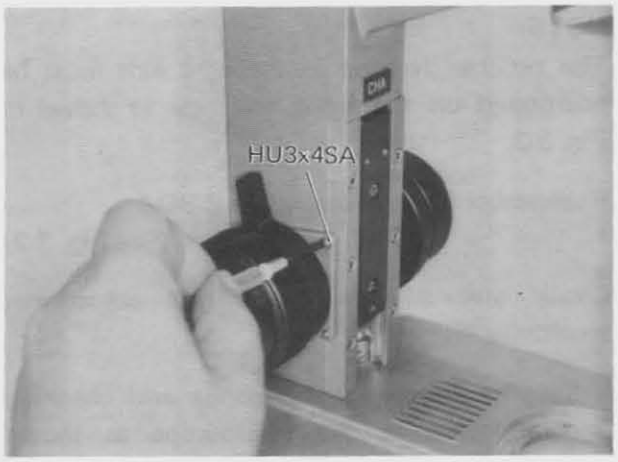


Fig. 10-1

10-1-1 Loosen two Adjusting screws HU3x4SA on the left coarse adjustment guide.

(See Fig. 10-1)

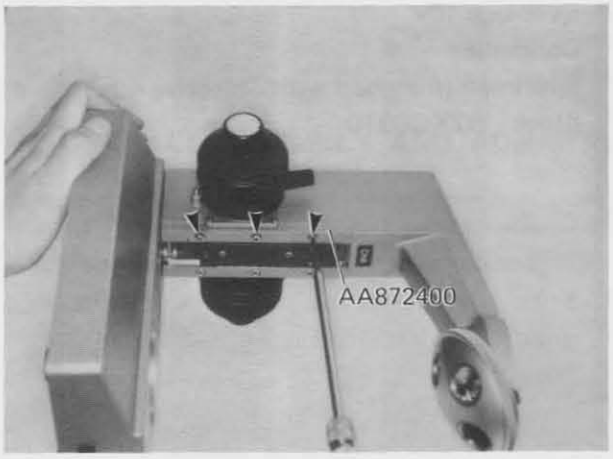


Fig. 10-2

10-1-2 Dismount left Outer guide AA872400 by removing three Screws AB3x10SA.

(See Figs. 10-2, 10-3)

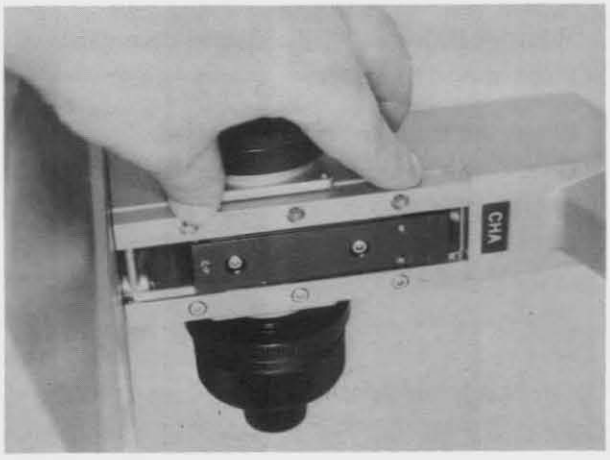


Fig. 10-3

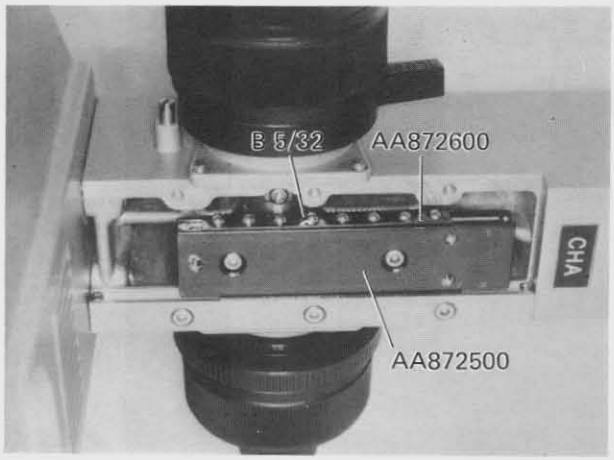


Fig. 10-4

10-1-3 Remove eight Balls B 5/32, Casing AA872600 and Inner guide AA872500. (See Fig. 10-4)

Fig. 10-5

10-1-4 Remove eight Balls B 5/32 and Casing AA-872600. (See Fig. 10-5)

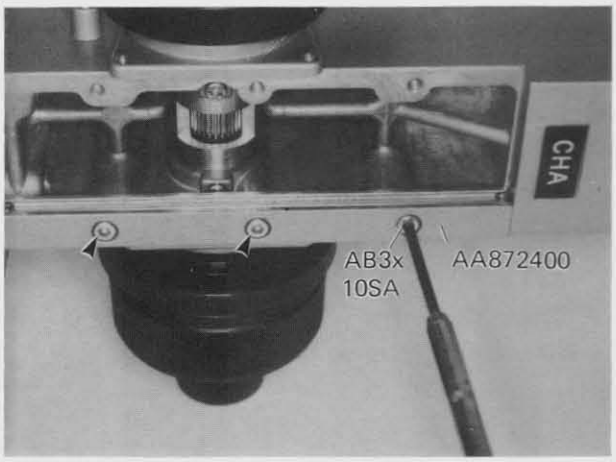


Fig. 10-6

10-1-5 Disassemble right Outer guide AA872400 by removing three Screws AB3x10SA. (See Fig. 10-6)

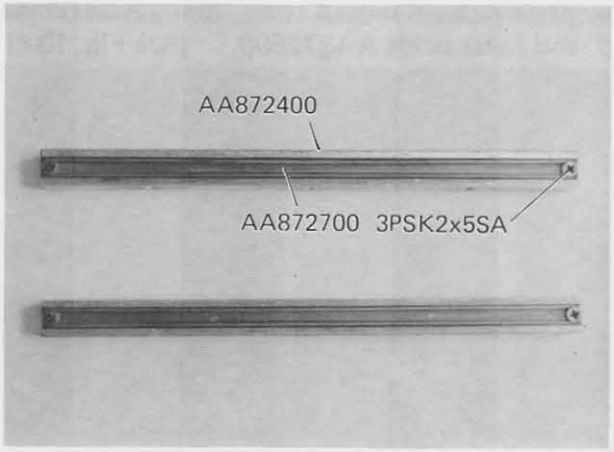


Fig. 10-7

10-1-6 Disconnect two Wires AA872700 from each of right and left Outer guides AA872400 by removing two Screws 3PSK2x5SA from each guide. (See Fig. 10-7)

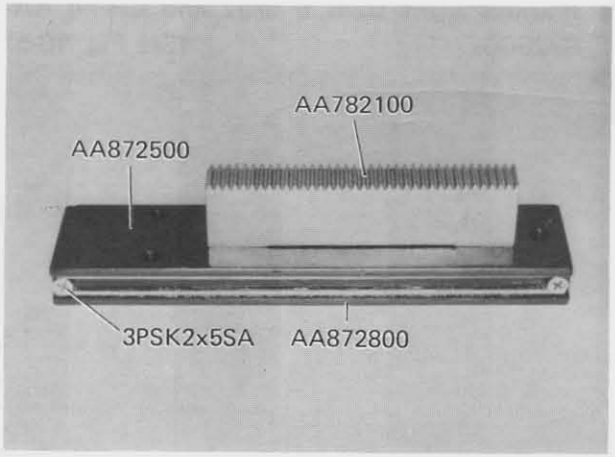


Fig. 10-8

10-1-7 Disconnect four wires AA872800 from Inner guide AA872500 by removing four Screws 3PSK2x5SA. (See Fig. 10-8)

10-1-8 Dismount Rack AA782100 from Inner guide AA872500 by removing two Screws AB3x 10SA. (See Fig. 10-8)

NOTE:
For later steps, proceed to 3-5 of this manual.

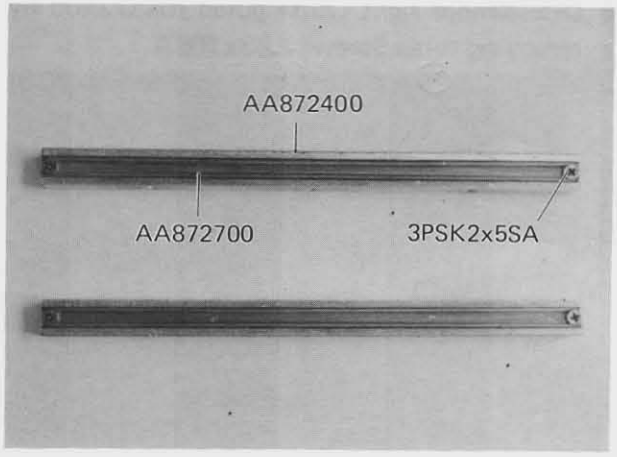


Fig. 10-9

10-2 Reassembling procedures for coarse adjustment guide.

10-2-1 Connect two Wires AA872700 to each of right and left Outer guides AA872400 by using two Screws 3PSK2x5SA for each guide. (See Fig. 10-9)

NOTE:
Check the wires for flaws and bending. Use wires which have no flaw or bending.

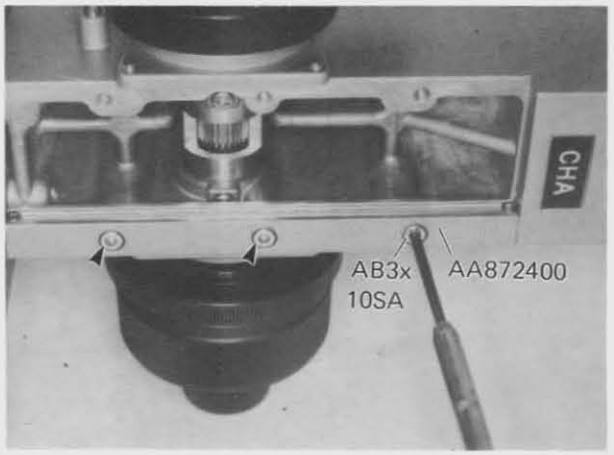


Fig. 10-10

10-2-2 Reassemble the right outer guide by using three Screws AB3x10SA. (See Fig, 10-10) Attach the right outer guide to the protrusion formed at the center of the arm and reassemble the guide parallelly.

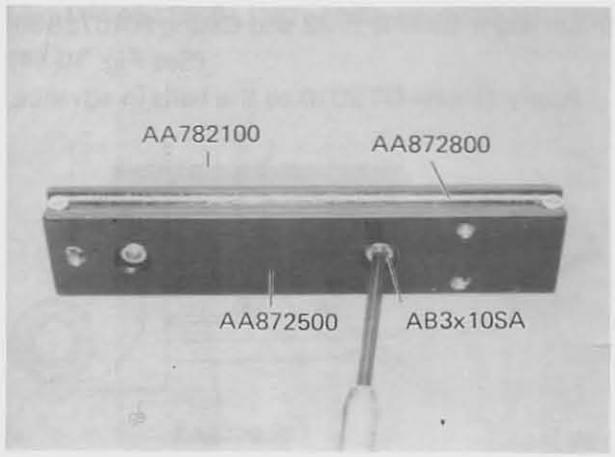


Fig. 10-11

10-2-3 Reassemble the inner guide into unit.

a) Reassemble Rack AA782100 with Inner guide AA872500 by using two Screws AB3x10SA. (See Fig. 10-11)

b) Connect four wires AA872800 by tightening four Screws 3PSK2x5SA. (See Fig. 10-11)

NOTE:
Check the wires for flaws and bending. Use wires which have no flaw or bending.

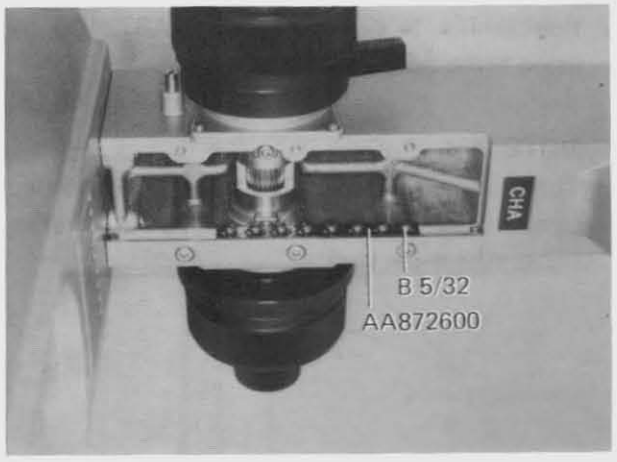


Fig. 10-12

10-2-4 Set eight Balls B 5/32 and Casing AA872600 into the right outer guide. (See Fig. 10-12) Apply Grease OT2010 to the balls in advance.

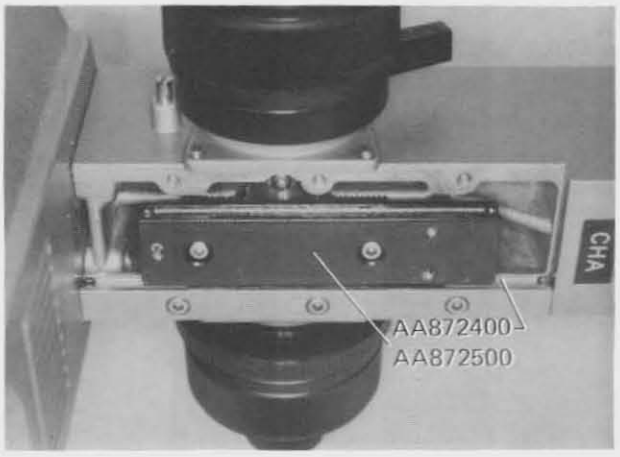


Fig. 10-13

10-2-5 Set the inner guide unit into the microscope stand. (See Fig. 10-13)

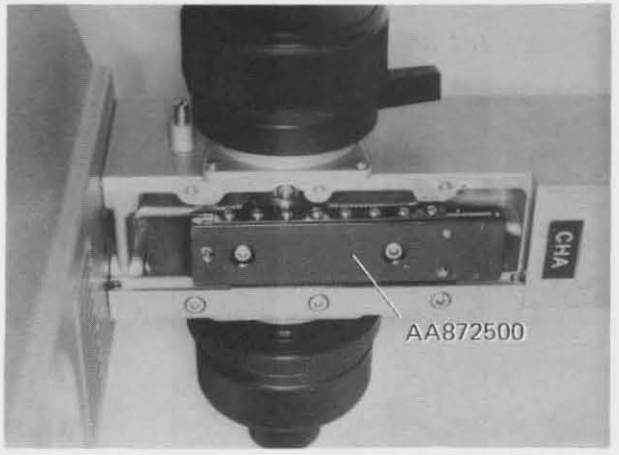


Fig. 10-14

10-2-6 Set eight Balls B 5/32 and Casing AA872600. (See Fig. 10-14)
Apply Grease OT2010 to the balls in advance.

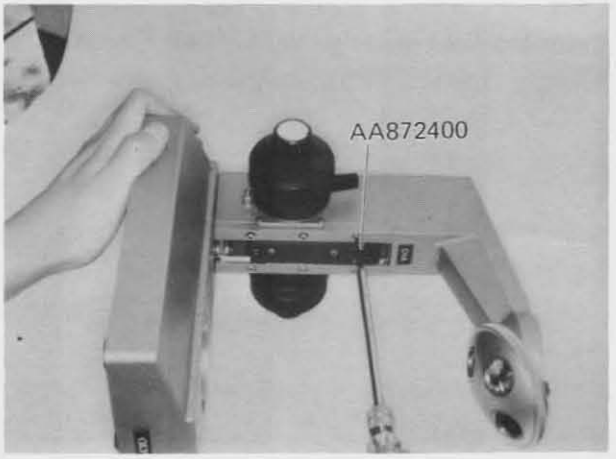


Fig. 10-15

10-2-7 Reassemble left Inner guide AA872400 by using three Screws AB3x10SA. (See Fig. 10-15)

NOTE:
Three Screws AB3x10SA should be tightened temporarily (loosen about 1/6 turn after tightening them firmly).

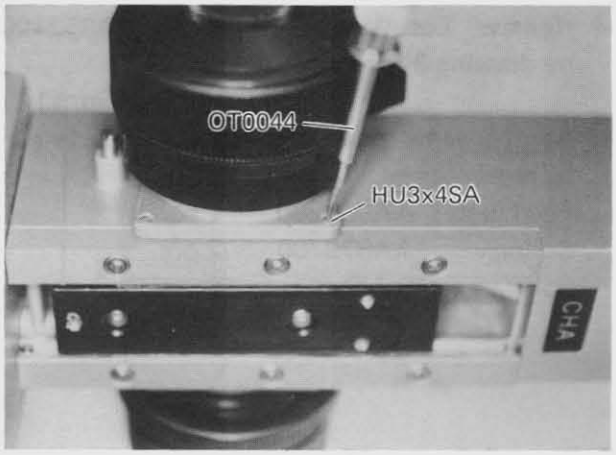


Fig. 10-16

10-2-8 Adjust the guide

a) Tighten two Adjusting screws HU3x4SA by using Torque screwdriver OT0044. (See Fig. 10-16)

Tightening force: 700 g·cm

b) Finally tighten three Screws AB3x10SA on the outer guide.

NOTE.

For later steps, proceed to Section 5 of this manual.

11. DISASSEMBLING AND REASSEMBLING PROCEDURES FOR C-MVR

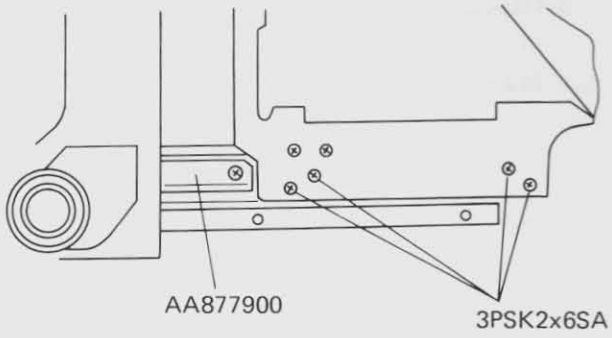


Fig. 11-1

11-1 Disassembly procedure of East-West Drive guide

11-1-1 Remove Specimen holder unit by drawing 4 Screws 3PSK2x6SA. (See Fig. 11-1)

11-1-2 Remove Rack AA877900 by drawing 3 Screws 3PUK2x6SA. (See Fig. 11-1)

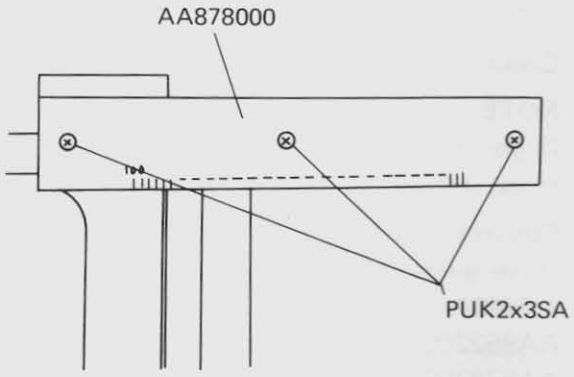


Fig. 11-2

11-1-3 Remove East-West Graduated plate AA-878000 by drawing 3 Screws PUK2x3SA. (See Fig. 11-2)

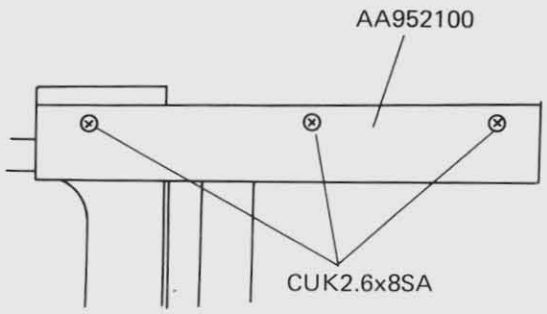


Fig. 11-3

11-1-4 Remove East-West Drive guide AA952100 by drawing 3 Screws CUK2.6x8SA.

(See Fig. 11-3)

At the same time, the following parts can be removed:

Feed plate	AA952200	1 pc.
Casings	AA879700	2 pcs.
Balls	B-1/8	18 pcs.

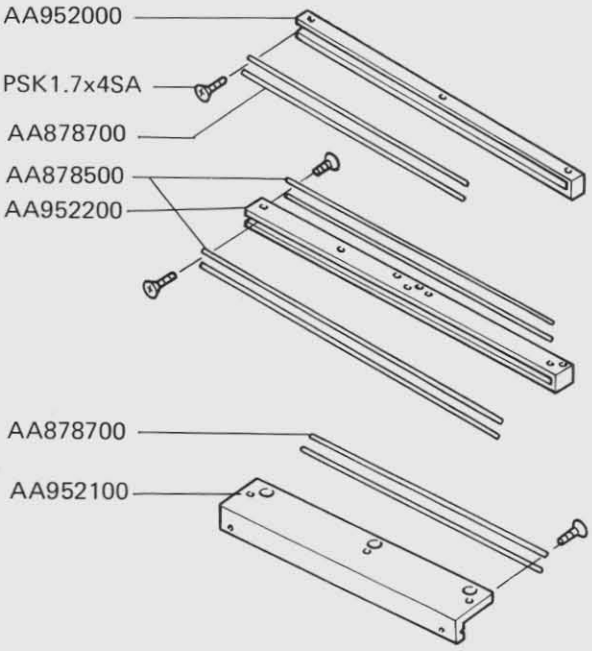


Fig. 11-4

11-1-5 Draw 2 Screws PSK1.7x4SA from East-West Drive guide AA952100, 4 Screws from Feed plate AA952200, and 2 Screws from East-West Drive guide AA952000; and then 4 Wires of AA878700 and AA878500 each can be removed. (See Fig. 11-4)

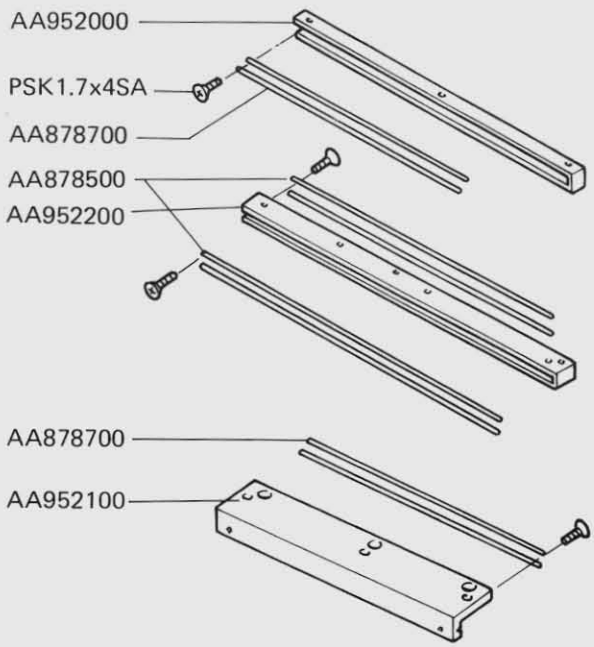


Fig. 11-5

11-2 Reassembly procedure of East-West Drive guide

11-2-1 Clean each part.

NOTE:
If you find bent wires or flaws on Ball surfaces, replace.

11-2-2 Connect 2 Wires AA878700 to East-West Drive guide AA952100 with 2 Screws PSK-1.7x4SA, 4 Wires AA878500 to Feed plate AA952200 with 4 Screws, and 2 Wires AA878700 to East-West Drive guide AA-952000 with 2 Screws respectively.

(See Fig. 11-5)

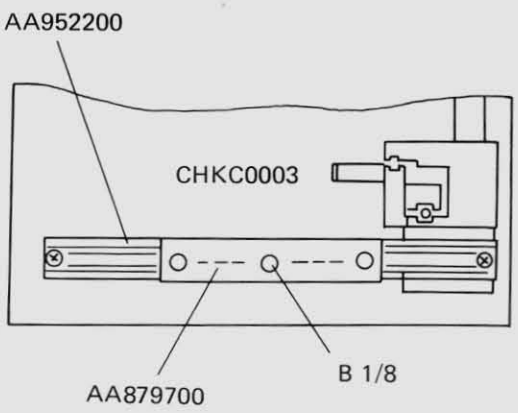


Fig. 11-6

11-2-3 Place the reassembled East-West Drive guide on Support frame CHKC0003.

(See Fig. 11-6)

11-2-4 Place Casing AA879700 in the middle of East-West Drive guide AA952000 and set 9 Balls B-1/8 into the holes of Casing.

(See Fig. 11-6)

NOTE:

Apply a small amount of Grease OT2008 to these Balls.

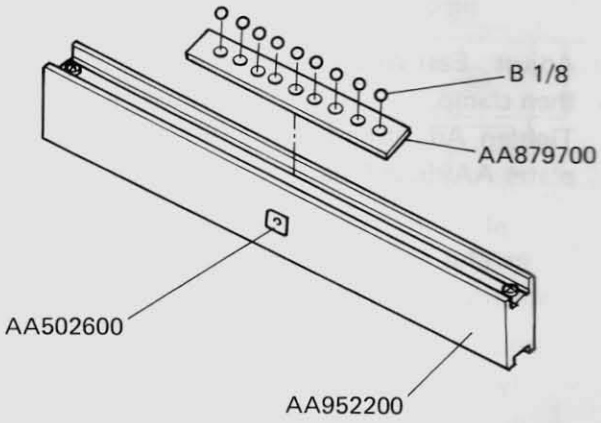


Fig. 11-7

11-2-5 Place Casing AA879700 in the middle of Feed plate AA952200 and set 9 Balls.

(See Fig. 11-7)

NOTE:

- Stopper AA502600 can be used as a mark to center Casing AA879700 on Feed plate with.
- Apply a small amount of Grease OT2008 to Balls.

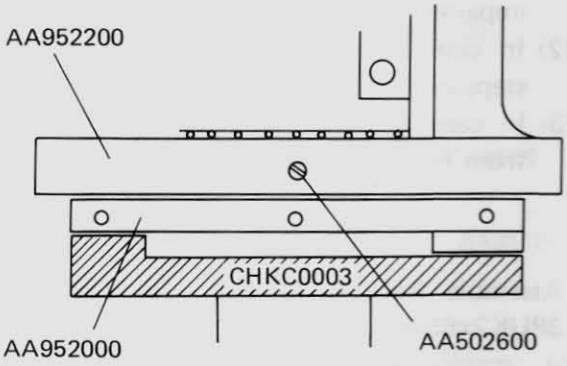


Fig. 11-8

11-2-6 Place Feed plate AA952200 (in step 11-2-4) on East-West Drive guide AA952000 (in step 11-2-3).

NOTE:

Align the positions of upper and lower Casings with each other vertically.

(See Fig. 11-8)

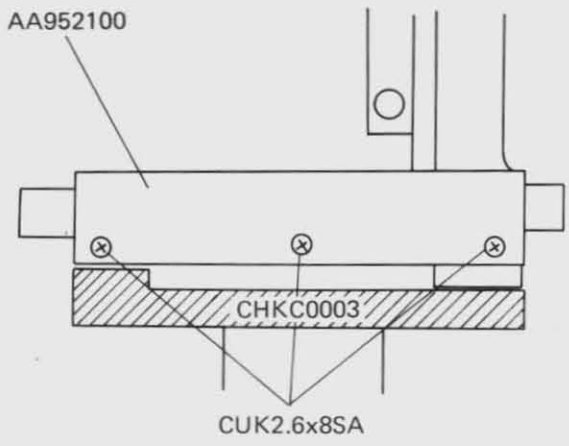


Fig. 11-9

11-2-7 Reassemble East-West Drive guide AA952100 temporarily with 3 Screws CUK2.6x8SA. (See Fig. 11-9)

NOTE:
Do not clamp too tight.

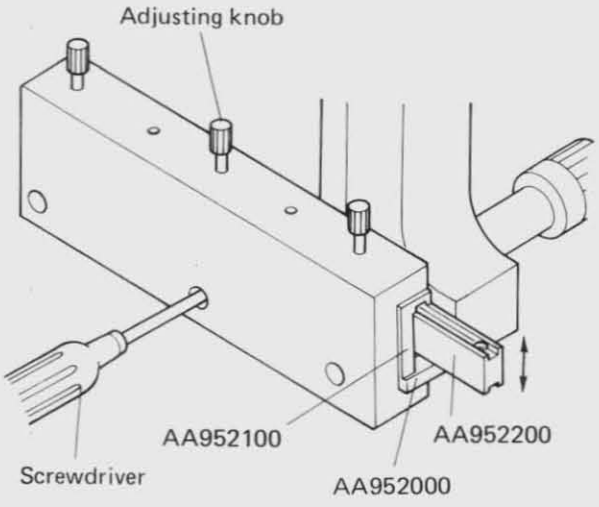


Fig. 11-10

11-2-8 Set the jig CHKC0002 as shown in Fig. 11-10.

11-2-9 Adjust East-West Drive guide AA952100, then clamp. (See Fig. 11-10)

a) Tighten Adjusting knobs evenly so that Feed plates AA952200 have no play.

NOTE:
Be careful not to impair Wires by tightening Adjusting knobs too much.

b) Clamp East-West Drive guide AA952100 firmly with 3 Screws CUK2.6x8SA.

c) Loosen Adjusting knobs.

d) Manipulating Feed plate AA952200, check whether it still has uneven stiffness, irregular movements or play.

(1) In case of uneven stiffness, Wires are impaired. Replace.

(2) In case of irregular movements, repeat steps over again from 11-2-9 (a).

(3) In case of play, repeat steps over again from 11-2-9 (a).

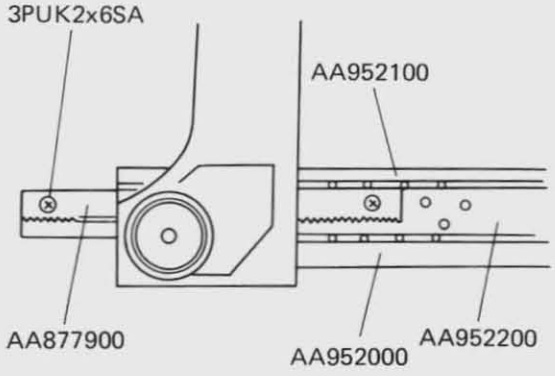


Fig. 11-11

11-2-10 Assemble Rack AA877900 with 3 Screws 3PUK2x6SA. (See Fig. 11-11)

a) By manipulating East-West Drive knob, check whether Rack has uneven stiffness, irregular movements or play.

b) If it has stiff or erregular movements or play, adjust the position of Rack AA877900.

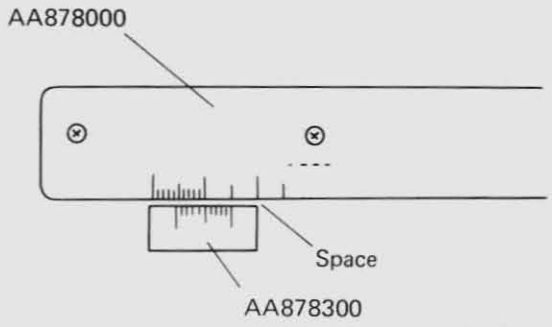


Fig. 11-12

11-2-11 Assemble East-West Graduated plate AA-878000 with 3 Screws PUK2x3SA.

11-2-12 Assemble Specimen holder unit with 4 Screws 3PSK2x6SA. (See Fig. 11-1)

11-2-13 Adjust the space between East-West Graduated plate AA878000 and Vernier AA878300 by moving the position of East-West Graduated plate AA878000. (See Fig. 11-12)

Standard space: 0.1mm ± 0.05mm

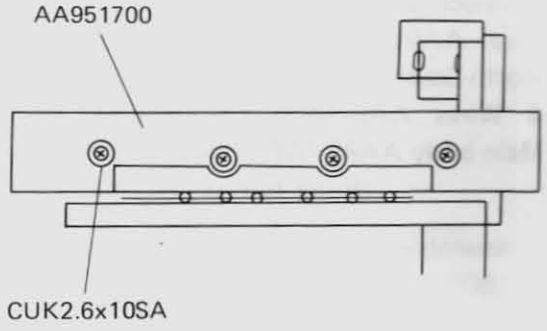


Fig. 11-13

11-3 Disassembly Procedure of North-South Drive guide

11-3-1 Remove Specimen holder unit by drawing 4 Screws 3PSK2x6SA. (See Fig. 11-1)

11-3-2 Remove 4 Screws CUK2.6x10SA that have clamped North-South Guide AA951800 to Mounting Base AA951700. (See Fig. 11-3)
Then, the following parts will come off:

Mounting base	AA951700	1 pc.
North-South Guide	AA951800	1 pc.
Balls	B-1/8	18 pcs.
Casings	AA878400	2 pcs.

11-3-3 Remove 2 Screws PSK1.7x4SA from Mounting base AA951700, 4 Screws from North-South Guide AA951800, and 2 Screws from Specimen holder Main Body AA951600; and then 4 Wires AA878600 and 4 Wires AA878700 will come off. (See Fig. 17-14)

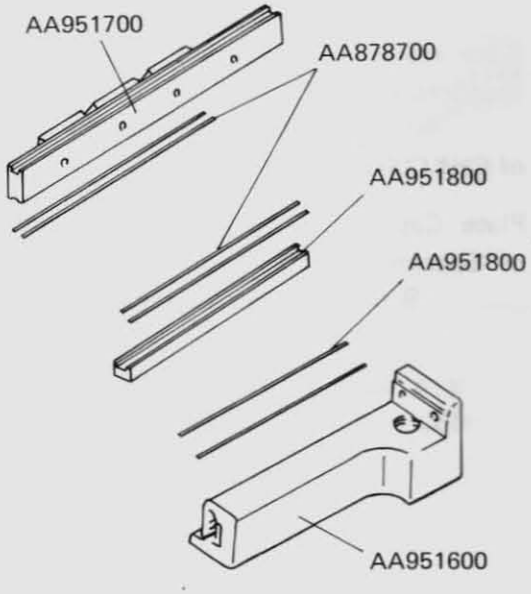


Fig. 11-14

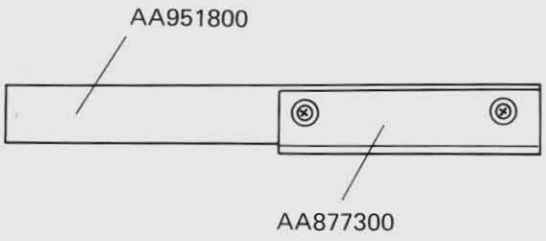


Fig. 11-15

11-3-4 Remove Rack AA877300 from North-South Drive guide AA951800 by drawing 2 Screws CUK2.6x5SA. (See Fig. 11-15)

11-4 Reassembly Procedure of North-South Drive guide

11-4-1 Clean each part.

NOTE:
If you find bent Wires or flaws on Ball surfaces, replace.

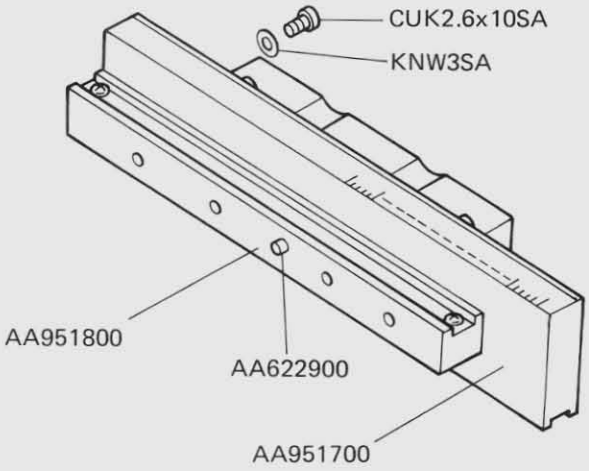


Fig. 11-16

11-4-2 Connect 2 Wires AA878700 to Mounting base AA951700, 2 Wires AA878700 to North-South Drive guide AA951800, and 4 Wires AA878600 to Specimen Holder Main body AA951600 respectively.
(Refer to Figs. 11-14 and 11-16)

11-4-3 Reassemble North-South Drive guide AA-951800 to Mounting base AA951700 temporarily with 3 washers KNW3SA and 3 Screws CUK2.6x10SA.

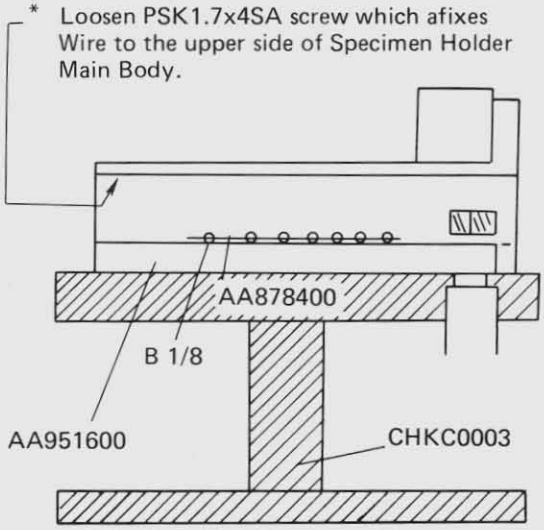

* Loosen PSK1.7x4SA screw which afixes Wire to the upper side of Specimen Holder Main Body.
AA878400
B 1/8
AA951600
CHKC0003

Fig. 11-17

11-4-4 Place reassembled North-South Drive guide on Frame CHKC0003 in a manner that East-West Drive knob fits into the opening of CHKC0003.

11-4-5 Place Casing AA878400 at the lower side of Specimen holder Main body AA951600 and set 9 Balls B-1/8 in the holes of Casing.

NOTE:
Apply a small smount of Grease OT2008 to Balls.

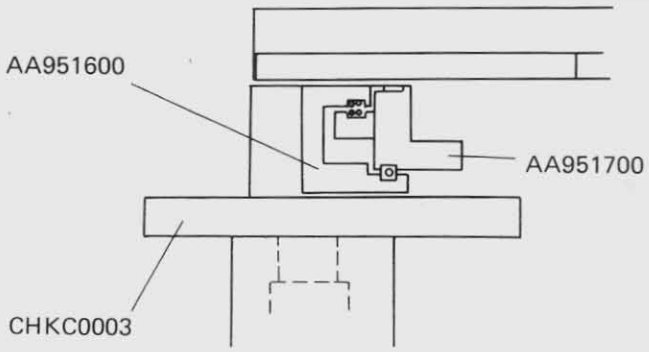


Fig. 11-18

11-4-6 Reassemble Mounting base AA951700 to Specimen holder Main body AA951600.

NOTE:

Be careful not to disperse Balls out of position.

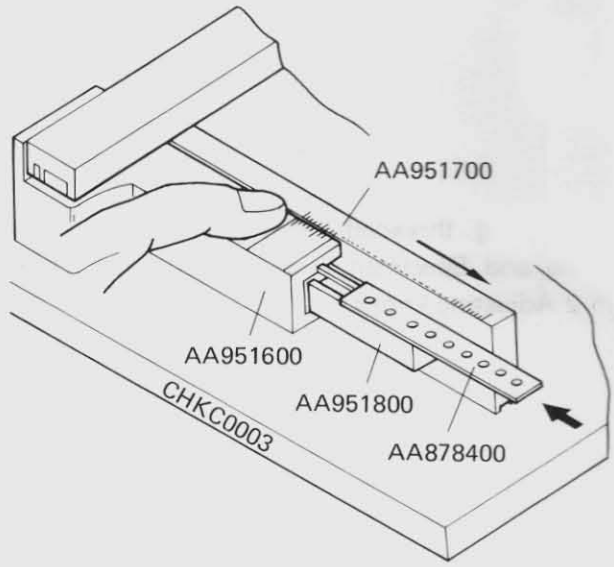


Fig. 11-19

11-4-7 Holding Mounting base reassembled in step above with the finger in position, assemble Casing and Balls as follows: (See Fig. 11-19)

a) Pull out Mounting Base AA951700 in the arrow direction (→) up to the position of Stopper and hold there with the finger.

b) Insert Casing AA878400 in the arrow direction (⇒) until its tip enters Specimen holder Main body AA951800, then put one or two Balls B-1/8 into the holes of Casing.

c) After setting other Balls into Casing, further insert Casing into Main body AA951600.

NOTE:

Repeat step above until 9 Balls are set in place.

d) After setting all Balls in place, push the entire Casing AA878400 with the tip of a screwdriver into a same position as Casing AA878400 was positioned in step 11-4-5.

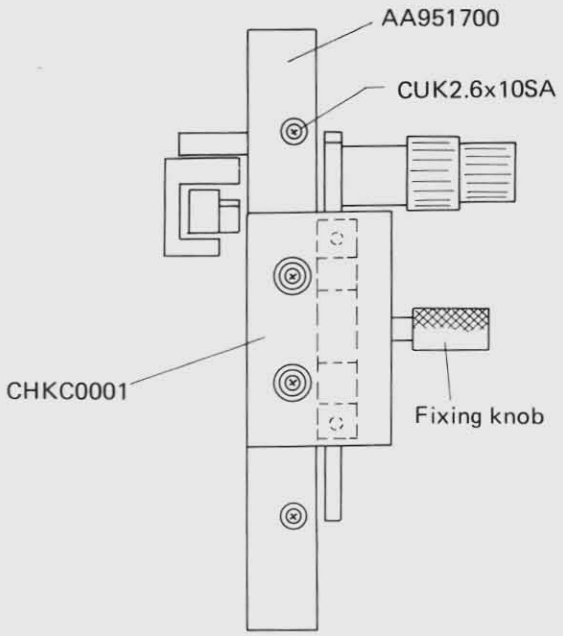


Fig. 11-20

11-4-8 Keeping Balls in Casing with the finger, remove the assembly of North-South Drive guide from Frame CHKC0003, and set the jig CHKC0001 in position.

a) Screw the Jig CHKC0001 to Mounting base AA951700, aligning to screw thread of Mounting base. (See Fig. 11-20)

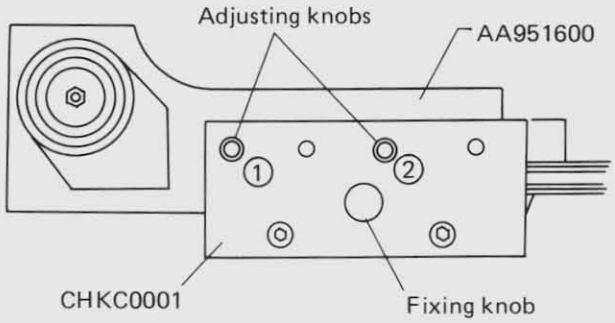


Fig. 11-21

b) Aligning threaded holes (1) & (2) of the Jig and Specimen holder Main body, clamp 2 Adjusting knobs. (See Fig. 11-21)

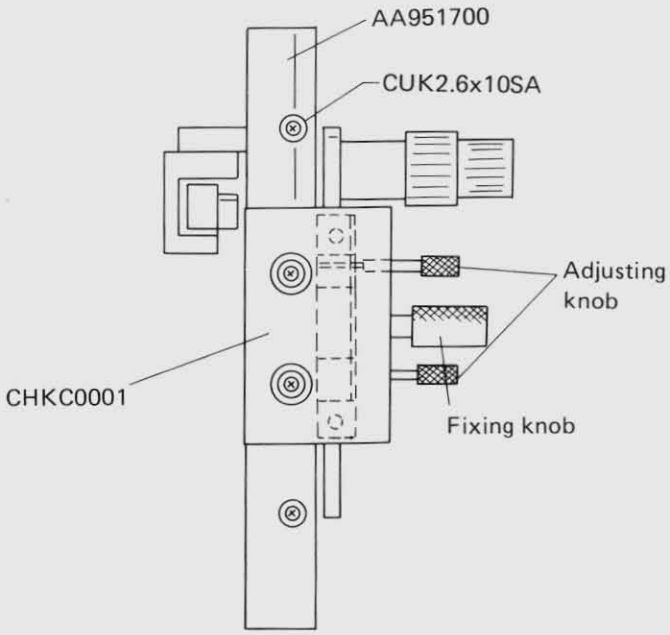


Fig. 11-22

11-4-9 Adjust North-South Drive guide.

a) Loosen 4 Screws CUK2.6x10SA of Mounting base AA951700 slightly.

b) Clamp 2 Adjusting knobs evely so that no play is left.

c) Clamp 4 Screws CUK2.6x10SA securely.

d) Remove the Jig CHKC0001.

e) By mainpulating Mounting base AA951700, check whether it still has uneven stiffness, irregular movement or play.

(1) In case of irregular movement or play: Repeat steps over again from 11-4-8.

(2) In case of uneven stiffness: Wires AA878600, AA878700 and Balls B-1/8 are defective. Make readjustment over again from step 11-3.

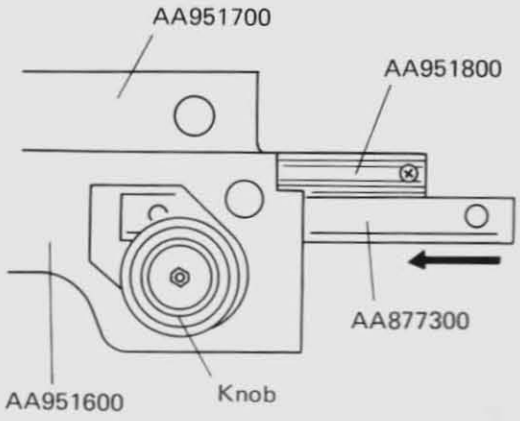


Fig. 11-23

11-4-10 Clamp Rack AA877300 with 2 Screws CUK2.6x5SA and 2 Washers KNW2.6SA.

a) Insert Rack AA877300 in the arrow direction and aligning the threaded holes, clamp with screws temporarily. (See Fig. 11-23)

b) By manipulating North-South Drive knob, check whether it has uneven stiffness, irregular movement or play.

c) If any, adjust the mounting position of Rack AA877300.

11-4-11 Mount Specimen holder unit with 4 Screws 3PSK2x6SA.

a) Make adjustment between east-West Graduated plate AA878000 and Vernier AA878300. (Refer to step 11-2-13)

Progress through Precision

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